University of Alberta

Clinical nurse educators and research utilization

by

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Dedication

For my family...

Wesley Clyne
Erin Hoselton
Jill Hoselton
Alison Hoselton
Peter Clyne
Graham Clyne
Lucy Milner-Clyne

...as each of them hold a special place in my heart.

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CLINICAL NURSE EDUCATORS AND RESEARCH UTILIZATION

Introduction and Overview

This thesis is the product of a masters program of education and research. The purpose of my research was to study clinical nurse educators and research utilization. As organizations look for ways to ensure health professionals practice from an evidence base, the demand for "intermediaries" in clinical practice to facilitate research utilization in practice is increasing. This research identifies determinants of research utilization among a group of Alberta nurses with clinical nurse educators as the primary focus of the study.

Context/ Clinical Nurse Educators and Research Utilization

The clinical nurse educator's primary role is facilitating the professional development of staff nurses. Responsibilities of the position include the orientation of new staff nurses, acting as an information source to staff nurses, administrators, patients, and other health care professionals on issues related to practice, and assisting in the development of policies and procedures based on available and recent evidence. Some clinical nurse educators function as patient teachers for inpatients and patients in ambulatory care settings. These educators are also involved in orientation and ongoing professional development of staff nurses in their area of specialty. Clinical nurse educators also function in community settings, acting as population health consultants in specific areas of practice. Clinical nurse educators, in collaboration with other 'intermediaries' such as clinical nurse specialists, advanced practice nurses, and nursing administrators, facilitate research utilization processes within nursing communities. Their efforts contribute to achieving best practice and the creation of an evidence-based culture in health organizations.

My experience as a clinical nurse educator was the impetus for this research. In 1995, I was actively involved in the development of regional guidelines for infection control, a long and laborious process involving a multitude of stakeholders. The dissemination of these guidelines took place over the course of one year and the issues they raised throughout the region were numerable. Practice differences across sites and practitioner resistance to change were significant obstacles. Despite our efforts to forecast foreseeable problems before implementation, we had to revise the guidelines to address the context of our particular site, a process that took an additional year. Several physicians provided me with articles from medical journals that I did not understand to justify maintaining traditional practices the guidelines did not support. An evaluation we conducted one year following dissemination of the revised guidelines revealed that less that 25% of the hospital staff was aware that the guidelines existed.

On the heels of this experience, I was once again involved in the implementation of recently completed regional wound care guidelines in 1997. As a clinical nurse educator,

I assisted in the coordination of an extensive program of education and marketing to introduce the guidelines to all staff across the hospital. Following the three-month campaign, I was frustrated with the poor adherence to the guidelines by staff nurses and physicians. Today, the colourful posters we mounted on the walls of patient care units collect dust in storage closets and the guidelines are all but a distant memory.

Impetus for this Masters Research

These experiences, among others, were the motivation for my return to graduate school. As I started my course work in the Master of Nursing program, I became aware of how undeveloped by critique and appraisal skills were, and I began to wonder about the quality of the work I had been doing, particularly in the area of guideline and policy development. In conversation with colleagues, I realized that many clinical nurse educators experienced similar feelings and frustrations. With few clinical nurse specialists to mentor us, we soldiered on, supporting one another in any way we could.

This research is a culmination of these experiences combined with the knowledge I have acquired as a student under the tutelage of Dr.Carole Estabrooks in the Knowledge Utilization Studies in Practice Unit at the University of Alberta Faculty of Nursing. I was able to study clinical nurse educators and research utilization using the 2002 *Alberta Nurse Survey* database (Estabrooks, Chong, & Birdsell, 2003), an extension of a national study on the utilization of health research results in Canada (Landry, Amara, & Lamari, 2001).

Research Questions

The research questions that guided this thesis include:

1. *What do we know about research utilization and clinical nurse educators?*
2. *What are the determinants of research utilization among clinical nurse educators?*

Design

Two empirical studies written as manuscripts for publication comprise this master's research.

Study 1: Systematic review of the literature on the research utilization behaviors of clinical nurse educators

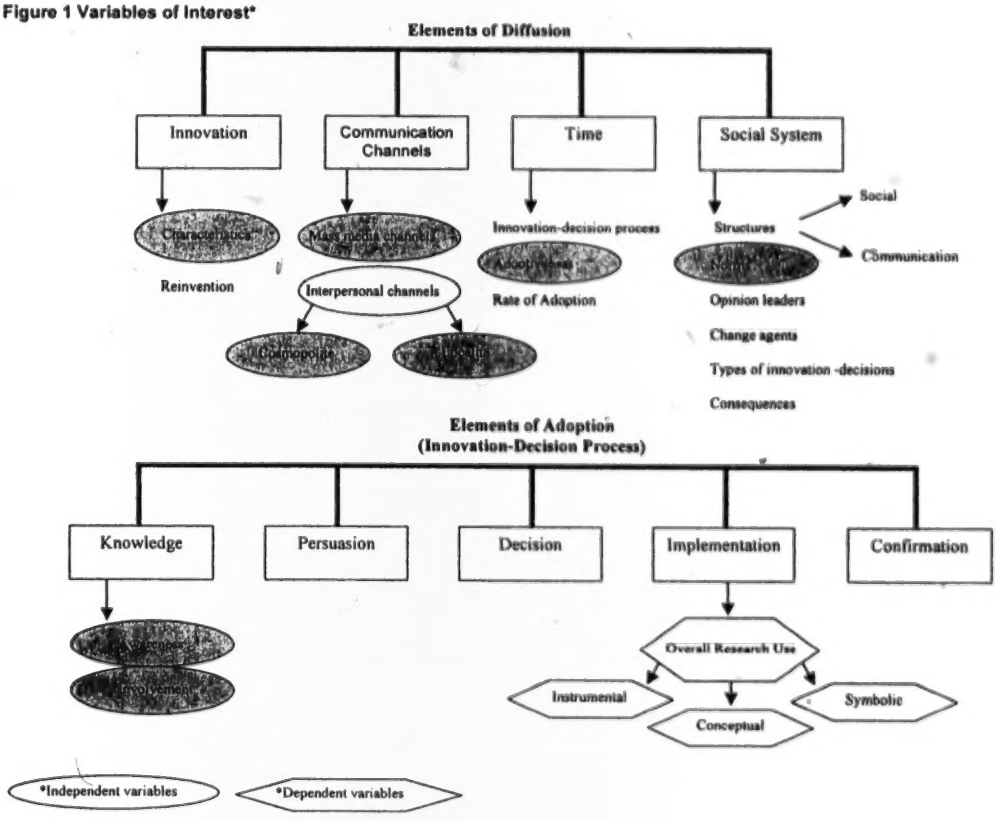
The first study of this thesis was a systematic review of the literature on clinical nurse educators and research utilization. The *Promoting Action on Research Implementation in Health Services (PARIHS)* framework (Rycroft-Malone et al., 2002) guided the review and analysis. Interpretation of the PARIHS framework suggests successful research

implementation is explained by "a function of the relationship between three elements: evidence, context, and facilitation" (p. 174). The nature of the evidence, the quality of the context, and the type of facilitation interact simultaneously and represent the complex and non-linear process of research utilization.

Study 2: Secondary analysis of the 2002 Alberta Nurse Survey database, using linear regression to examine the effects of individual determinants on research utilization among nurses.

The second study of this thesis examined the predictors of research utilization among a group of Alberta nurses, using clinical nurse educators as a reference group in the analyses. The selection of variables for study was guided by Rogers diffusion of innovations theory (Rogers, 1995). Rogers identifies six phases in the innovation-development process: 1) needs/problems, 2) research, basic and applied, 3) development, 4) commercialization, 5) diffusion and adoption, and 6) consequences. These phases do not necessarily occur in a linear sequence and not all phases occur in each cycle. I framed this study within the context of Roger's fifth phase, diffusion and innovation (Figure 1).

Figure 1 Variables of Interest*



Theoretical Frameworks

The Promoting Action on Research Implementation in Health Services framework and Diffusion of Innovations theory each guided study one and study two respectively in this thesis research. An overview of each of the frameworks used followed by a discussion of the relationship between the two is provided below.

Promoting Action on Research Implementation in Health Services (PARIHS)

The PARIHS framework suggests successful research implementation is explained by "a function of the relationship between three elements: evidence, context, and facilitation" (Rycroft-Malone et al., 2002, p. 174). The nature of the evidence, the quality of the context, and the type of facilitation interact simultaneously and represent the complex and non-linear process of research utilization.

Nature of the Evidence

Research, clinical experience, and patient preferences make up the three strands of *evidence* identified in the PARIHS framework. Regardless of the type of evidence used to inform decision-making, critical appraisal of the evidence is essential before considering its implementation. The PARIHS framework recognizes the social forces that influence evidence and propose that individuals and teams need to reach consensus on the appraisal of all forms of evidence to establish its validity. Both qualitative and quantitative research evidence are needed for decision-making as well as practice knowledge and patient experiences and narratives. Careful consideration of how these three forms of evidence are combined to inform clinical decision-making is needed.

Context

The *context* refers to "the physical environment in which practice takes place" (Rycroft-Malone et al., p. 176). Health care practice occurs within contexts that reflect the setting, community, and culture of organizations. A myriad of factors influence cultural values and beliefs within organizations including social, political, economical, historical, and psychosocial forces. Leadership, organizational learning, and evaluative mechanisms are additional manifestations of context that accentuate the complexity of organizations. Organizations with facilitative innovative cultures commonly manifest values that recognize individual contributions, have decentralized decision-making, a shared vision, role clarity, and quality organizational systems.

Facilitation

Kitson et al. (1998) define *facilitation* as a "technique by which one person makes things easier for others (p. 52). The PARIHS framework identifies three key sub-elements of facilitation, namely the purpose, role, and skills and attributes that contribute to its

successful application (Rycroft-Malone et al., 2002). Facilitation is generally an appointed role, either internal or external to an organization in which change is being implemented. Facilitation may be task-oriented or holistic in nature, dependent upon its purpose or the goal one is trying to achieve. Attributes needed for effective facilitation include project management, technical, marketing, and experiential credibility for task-oriented facilitation, and co-counseling, critical reflection, giving meaning, flexibility of role, and authenticity engender for holistic facilitation.

Diffusion of Innovations

Diffusion is the "process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1995, p. 5). The key concepts of diffusion are innovation, communication, time, and social system.

Innovation

Innovations are conceptualized as "ideas, objects, or practices" with an emphasis on perceived newness by individuals or units of adoption and characterized by some form of change or alteration in social structure or function (Rogers, 1995). Some researchers, particularly in nursing, have conceptualized innovation diffusion as the utilization of published research findings to answer a question, justify an existing practice, or provide guidance in clinical or policy decision-making (Brett, 1987; Michel & Sneed, 1995; Winter, 1990; Youngstrom, 1996; Rodgers, 2000). Factors that characterize and influence an innovation's rate of adoption include relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1995).

Communication

Communication is a two way process involving the sharing of information between two or more individuals with the goal of achieving a mutual understanding (Rogers, 1995). Mass media channels and interpersonal channels are the two main categories described by Rogers. Mass media channels represent efficient and cost-effective ways to transmit innovations to a large number of people and include the Internet, media, books, and journals. Interpersonal channels involve direct contact between one or more individuals. Rogers believes interpersonal channels are more effective because they have a persuasive quality in convincing others to accept new ideas or innovations. *Cosmopolite* individuals use communication channels external to their work environment and *localite* individuals use channels internal to their work environment.

Time

The innovation-decision process, the innovativeness of individuals or units of adoption, and an innovation's rate of adoption exemplify the *time* dimension. Rogers (1995) characterizes an individual's innovativeness into adopter categories that reflect the degree to which they actively seek out and are open to new ideas or innovations.

Innovators are venturesome, cosmopolite, risk-taking, and information seeking individuals. *Early adopters* are opinion leaders and are highly regarded in their social group. *Early majority* are deliberate individuals and adopt new ideas just before the average member of a system. *Late majority* are skeptical, often require peer pressure to motivate them, and adopt new ideas just after the average member of a system. *Laggards* are traditional, pay little or not attention to the opinions of others, and are the last in a social system to adopt an innovation. Innovativeness influences the rate of adoption by the members of a social system.

Social System

A *social system* creates the boundaries within which an innovation diffuses (Rogers, 1995). A social system is a set of interrelated units that are engaged in joint problem solving to accomplish a common goal over time. Individuals form patterned units within a social system. Norms that reflect the values and beliefs of social system govern its members. Factors such as social system norms, social and communication structures, presence of opinion leaders or change agents, the way in which social groups make innovation-decisions, and the consequences of innovations all influence the innovation-decision process and rate of adoption.

Concepts of the Innovation-Decision Process

Rogers (1995) identifies five distinct stages in the mental process that an individual or unit passes through in deciding whether to adopt or reject an innovation. The stages of adoption form the core of innovation diffusion theory and include:

1) knowledge, the extent to which a target population is conscious of an innovation,
2) persuasion, the formation of a favorable or unfavorable opinion towards the innovation,
3) decision, the engagement in activities that lead to adoption or rejection of an innovation,
4) implementation, putting an innovation to use, and
5) confirmation, seeking reinforcement or the integration of the innovation into practice (also includes the discontinuance of an innovation later on following adoption).

To move through these stages of the innovation-decision process takes time and individuals do not necessarily move through them in the sequence put forth. According to Rogers (1995), there is a tendency for researchers to see these stages as a linear process but his conceptualization is one that is non-linear where movement is not a predictable series of events, and nor do all phases occur for each innovation-decision cycle.

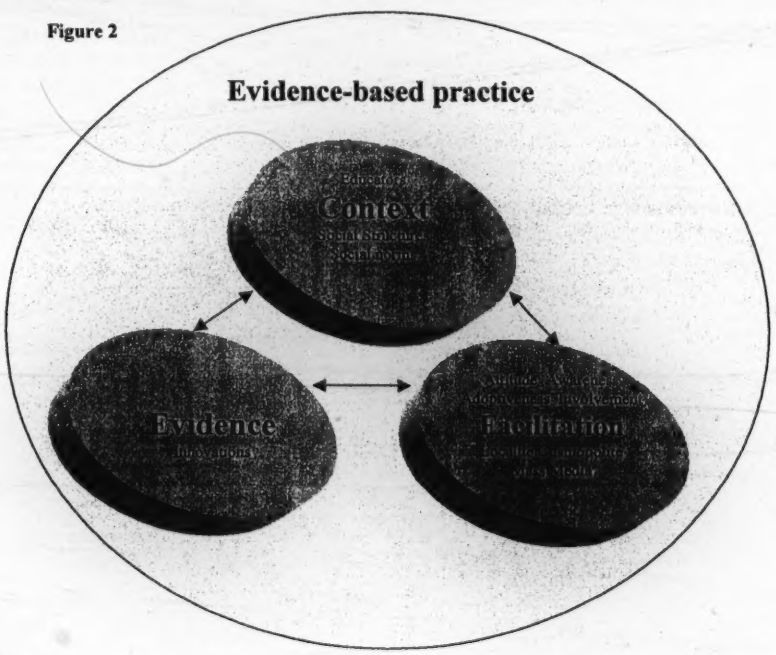
A number of authors have further conceptualized research utilization as instrumental, conceptual, and symbolic research use (Beyer & Trice, 1982; Estabrooks, 1999a; Estabrooks, 1999a; Stetler, 1994; Stetler, 1994). *Instrumental* research utilization is the

concrete application of research findings to make a decision or direct an intervention. The translation of the research into a tangible form, such as a policy, protocol, or guideline is often evident (Estabrooks, 1999a). *Conceptual* research utilization can inform or increase awareness of the research, changing the way an individual thinks about a particular topic or issue. This indirect use of research may influence action but in less tangible ways than instrumental use (Beyer & Trice, 1982). *Symbolic* research utilization is the use of research to "gain legitimacy" or to influence the opinions or views of others on a particular issue (Hasenfeld & Rino, 1992).

PARIHS Framework and Diffusion of Innovations Theory

Research utilization is a complex and multidimensional process. I viewed the PARIHS framework as an overarching structure that houses the elements described by diffusion theory. I felt it was reasonable to assume that innovations were synonymous with empirical research evidence as described in the PARIHS framework. Figure 2 shows the concepts studied from innovation diffusion theory couched within the PARIHS framework. The figure shows how the determinants of research utilization focus on the facilitative component of the PARIHS framework.

Figure 2



Methods

Study #1 – The method used was a systematic review of the literature. I searched several computerized bibliographic databases and hand searched selected nursing education journals using specific keywords for initial screening purposes. Using specific inclusion

criteria, I screened article by title and abstract for further reading. I rated each articles selected for in-depth reading using a validity assessment tool I developed based on specific research criteria. Only articles with a medium or high rating were included in the review.

Study #2 –The method used was testing of a model using linear regression and data from the *2002 Alberta Nurse Survey* with the permission of the principal investigators, Dr. Judy Birdsell and Dr. Carole Estabrooks. Trained staff from the University of Alberta Population Research Laboratory conducted the survey using Computer-Assisted Telephone Interviewing. The target population of the *2002 Alberta Nurse Survey* included nurses registered with the Alberta Association of Registered Nurses who had consented to participate in research activities on their 2002 registration renewal application. The researchers stratified the sample by role and regional size. Initial quotas were established (50 cases per cell) and cells with less than 50 cases from the initial sample pool had maximum total numbers assigned. Using random sampling for data collection from the initial pool, 389 participants completed the survey (Estabrooks et al., 2003).

Results

Paper #1: Research utilization and clinical nurse educators: A systematic review.

I conducted a systematic review of the literature to determine what is known about clinical nurse educators and research utilization. I did not find any such review in the literature. I examined 254 titles and abstracts using inclusion criteria of clinical nurse educators or clinical nurse specialists, or advanced nurse practitioners, and research utilization, and an adequate description of appropriate research design. From this group, I extracted data from 15 articles that formed the final group of included studies. Of these, twelve were quantitative and three were qualitative studies. Findings were grouped into categories: socioeconomic characteristics of adopters, information seeking behavior, attitudes and beliefs, research knowledge and skill, participation in research, and social structures.

Findings. Clinical nurse educators and research utilization are not well studied. Only one unpublished doctoral dissertation actually studied clinical nurse educators and research utilization. All other studies included in the review focused on clinical nurse specialists, academic educators, or a group of nurses in specialist roles or leadership positions as a part of the total sample population. Attitude and highest level of education were the only determinants identified with a consistent positive effect on research utilization. Other findings remained inconclusive. I identified that further research is needed to determine the effects of other determinants on research utilization by clinical nurse educators.

This paper, authored by Milner, Estabrooks, and Myrick is being submitted to the *Journal of Advanced Nursing* for publication.

Study #2: Clinical nurse educators as agents for change: Increasing research utilization in nursing practice.

I developed a model of research utilization using the findings from the literature review that was guided by diffusion of innovations theory (Rogers, 1995). I hypothesized that clinical nurse educators who were aware of research and possessed strong communication networks and characteristics of early adopters would have higher levels of research utilization. Variables selected for inclusion in the model were age, attitude, awareness of research, adoptiveness, mass media, cosmopolite, localite, involvement in research, social norms, highest level of education and regional size. In order to test the impact of the educators on research utilization, I created a dummy encoded variable for nursing role to represent membership as an educator, staff nurse, or manager. The educator was the reference group for the analyses. Outcome variables included overall, instrumental, conceptual, and symbolic research utilization. I thought it would be useful to determine if the model fit the different conceptualizations of research utilization put forth in the literature. Therefore, I ran four separate regressions using each of the different kinds of research utilization as the outcome variable and compared the results.

Findings. Predictors of overall research utilization include attitude, awareness, involvement, and age. Age varied inversely with overall research utilization. The proportion of variance in research utilization explained by the four models was modest ranging from 14%-39%. Awareness, attitude, and involvement were the most consistent predictors in the four models. Localiteness predicted conceptual research utilization and mass media predicted symbolic research utilization, providing support for the idea that overall, instrumental, conceptual, and symbolic research utilization are different from each other.

These findings have implications for the use of clinical nurse educators as facilitators of research utilization in health organizations, ongoing professional and graduate education, and the planning of strategies to enhance the uptake of research knowledge in practice.

This second paper, authored by Milner, Estabrooks, and Humphrey is being submitted for review to the *Canadian Journal of Nursing Research.*

Summary

The findings from these two papers demonstrate the need for further research on clinical nurse educators and other intermediaries on research utilization. Clinical nurse educators may be an overlooked resource and are important agents for the facilitation of evidence-based nursing practice in health organizations.

Contribution

Research Utilization Theory

Diffusion of innovations theory has utility for nursing and the study of research utilization in health. The dissemination and implementation of research findings reflects change processes which diffusion of innovations theory attempts to explain. I have identified a particular way of measuring aspects of the PARIHS framework using the theoretical perspective of diffusion of innovations. While the findings from this research primarily measure the facilitative aspect of the PARIHS framework, potential exists for diffusion of innovations theory to measure aspects of the context and the nature of the evidence elements as well. I have advanced the PARIHS framework by identifying latent concepts that measure aspects of facilitation, context, and the nature of the evidence used for decision-making. Mapping other research utilization models onto the PARIHS framework would be a useful exercise to further identify latent variables that measure aspects of evidence, context, and facilitation.

This research study tested the theory that overall, instrumental, conceptual, and symbolic research utilization are different from one another. This findings support the idea that these conceptualizations of research utilization are indeed different and that different variables influence their enactment in practice.

Nursing Research

I was able to test a model of research utilization using an archived database collected for another purpose, lending support for the use of secondary analysis as a fiscally responsible approach to study a phenomenon. Data collection is an expensive and time-consuming part of the research process. At a masters level, I believe that secondary analysis of archived data eliminates a major obstacle in learning about the research process, as data collection can be an arduous and frustrating activity, often impeding the completion of graduate studies.

The use of theory from other disciplines, in this case agriculture and evidence-based practice, is an important consideration for nursing. Drawing on knowledge and theory from a variety of disciplines enriches and enhances understanding of nursing phenomena from differing perspectives. The findings from this research lend support for the existence of a gap between research and practice. Despite the differences in the different forms of knowledge generated by basic and applied research, the enactment of research findings in practice continues to challenge practitioners and researchers. My findings demonstrate this through the differences in research utilization behaviors of clinical nurse educators, staff nurses, and managers. Clinical nurse educators may use research more due to their ability to contextualize research findings for their particular areas of practice.

Nursing Practice

The findings from this thesis show that the research utilization behaviors of clinical nurse educators enable them to assist in bridging the gap between research and practice. Administrators and academics need to consider what types of knowledge and skill clinical nurse educators need to use research effectively in practice, collaborating on the design and implementation of education programs and curricula that target research utilization theory and practice. Nurses involved in research utilization activities in organizations need to understand how instrumental, conceptual, and symbolic research utilization differ from one another and to determine what form(s) they are trying to influence in nursing practice.

Limitations

1. The inclusion criteria for the literature review may have been too limiting. As many nurses in educator and specialist positions have administrative responsibilities, broadening the criteria to include administrators may have generated results that are more comprehensive.

2. The greatest challenge that I faced was the construction of variables from the questions used in the survey. I measured awareness of research by examining the frequency of use of information sources with a strong research base to support them. Although this provides us with some insight into their research utilization behavior, accurate assessment of the knowledge and skills needed to practice from an evidence base demands a different approach than the one taken for this study. Creating scenarios with the use of case studies may be one approach.

3. Surveys that ask value-laden questions present a particular problem in relation to social desirability. Clinical nurse educators with whom I spoke at a stakeholder meeting before conducting this research indicated that they felt pressure to emulate the tenants of evidence-based practice but did not feel they necessarily had the knowledge and skill to do this effectively. These comments resonated with me and left me wondering how many educators in the sample felt impelled to exaggerate their answers, if only to convince themselves that they were meeting the challenge to achieve best practice in spite of limited knowledge and resources.

Conclusion

This thesis research identifies the gap between what is known about clinical nurse educators and research utilization and what is needed for future study. Future research that studies the effectiveness of clinical nurse educators as facilitators of research utilization would be one approach. Research that examines the actual ability of clinical nurse educators to use research in practice would aid in the development of strategies to enhance their effectiveness as facilitators of evidence-based nursing practice.

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Paper #1 – Research utilization and clinical nurse educators: A systematic review

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Research Utilization and Clinical Nurse Educators: A systematic review

INTRODUCTION

Context

Currently, the uptake and use of research findings is high on the agendas of governments, decision-makers, and research funding agencies in response to health care restructuring and diminishing resources, coupled with demands for effective care, quality services, and increased professional accountability. Research in the field of evidence-based practice has focused attention on strategies to improve the quality and cost-effectiveness of health care. Facilitation, a concept central to the *Promoting Awareness of Research Implementation in Health Services* framework (Harvey et al., 2002), is a strategy that engenders the use of intermediaries or knowledge brokers to increase the use of research findings in health. Generally speaking, knowledge brokers bring people together, foster the development of relationships, and enhance the sharing and movement of knowledge and ideas between individuals and groups (Canadian Health Services Research Foundation, 2003). The Canadian Health Services Research Foundation (CHSRF) recognizes the role of knowledge brokering as an important link in the research utilization process in health organizations and is currently creating a training program to foster their development and visibility. Intermediary and brokering roles in nursing include clinical nurse educators, clinical nurse specialists, advanced nurse practitioners, and nurses working in research leadership positions.

Roles across Countries

Clinical nurse educators, staff development educators (North America), and practice developers (United Kingdom, Australia) are all terms synonymous with nursing

roles in which professional development of practicing nurses (clinicians) is promoted and facilitated. Kelly-Thomas (1998) defines nursing staff development as "the organization of prescribed developmental activities that assist the organization in reaching defined goals through the assessment, maintenance, and development of nursing competencies" (p. 58). Practice development is defined as "a continuous process of improvement towards increased effectiveness in patient-centered care, through the enabling of nurses and health care teams to transform the culture and context of care (McCormack, Manley, Kitson, Titchen, & Harvey, 1999). Although conceptually different with respect to their specific objectives, overarching responsibilities for both roles includes the facilitation of change and the encouragement of professional development to improve patient outcomes. For simplification, we use the term clinical nurse educator throughout this paper in reference to these "intermediary" roles in professional nursing education. The clinical nurse educator facilitates research utilization in health organizations by conducting literature searches and providing relevant research articles to staff nurses and other health care professionals as needed.

Research Utilization Strategies

Efforts to understand how research evidence is transferred effectively into practice have focused on the individual, social, and organizational determinants of research use. Research has shown that the passive diffusion of knowledge, regardless of its efficacy or relevance to a particular context, is insufficient to ensure its adoption in practice (Rich, 1979; Rogers, 1995; Dopson, FitzGerald, Ferlie, Gabbay, & Locock, 2002). However, Grimshaw et al. (2004) suggest reconsidering the conclusions drawn by these authors. In a recent, systematic review of the effectiveness and efficiency of

guideline dissemination and implementation strategies, they cautiously conclude that the utilization of educational materials may be more important than previously thought when median effects, associated costs, and contextual factors are considered.

The classic Iowa hybrid corn study by Ryan & Gross (1943) illustrated the importance of interpersonal networks in diffusing an innovation within a social system (Rogers, 1995). Organizational theory attempts to explain the social nature of knowledge movement and the human elements that influence its production and enactment in practice (Orlikowski, 2002). In social science theory, investigators conceptualize knowledge within different practice communities and explore the networks that enhance the communication of knowledge between these communities in organizations (Dunn, 1980; Lave & Wenger, 1991; Knorr Cetina, 1991). Investigators have reported that nurses prefer human or social sources of information over other forms of knowledge (Thompson et al., 2001; Larsen, Adamsen, Bjerregaard, & Madsen, 2002; Estabrooks, Chong, Brigidear, & Profetto-McGrath, in press). The important influence of human factors on knowledge production and transfer suggested by these perspectives and studies sets the stage for research examining the role of "intermediaries" as bridges connecting knowledge and practice.

Intermediary Roles as a Research Utilization Strategy

Intermediary roles that have been studied and that are deemed important in facilitating research utilization include local opinion leaders, facilitators, and academic detailers. *Local opinion leaders* have been described as "individuals that influence others' attitudes or overt behavior in a desired way with relative frequency" (Rogers, 1995, p. 27). In a Cochrane review, Thomson O'Brien et al. (2000) identified the use of

local opinion leaders as a moderately effective intervention to promote the implementation of research findings in practice. Harvey et al. (2002) describe the role of *facilitator* as "individuals with the appropriate roles, skills, knowledge to help individuals, teams and organizations apply evidence into practice" (p.579). They report that although the role of facilitator was generally useful, they could not draw meaningful conclusions about the efficacy of facilitator intervention from the studies reviewed. The role of *academic detailers* was also identified as those who function as trained change agents who meet with clinicians to provide information with the intent to change the clinician's practice (Oxman, Thomson, Davis, & Haynes, 1995). Systematic reviews of interventions to promote implementation of research findings report academic detailers as somewhat effective and, in contrast to findings indicated earlier (Thomson O'Brien et al., 2000), report insufficient evidence to assess the impact of local opinion leaders (Bero et al., 1998). The primary focus of the intervention research in research implementation is physician practice. Clinical nurse educators, however, provide many of the functions described by these intermediary roles.

Who is Responsible for Research Utilization?

Studies have shown nurse educators to be an important influence in the advancement of knowledge in nursing practice (Adams & Cook, 1994; Considine & Hood, 2000). Indeed, scholars have identified clinical nurse educators as an essential link in fostering the use of research findings among staff nurses and other allied health professionals (Binger, 1979; Davis, 1990; Mottola, 1996). Clinical nurse educators are thus seen as logically suitable intermediaries who facilitate the use of research (Mottola, 1996; Ohman, 1996; Mackay, 1998).

Typically, organizations do not have well established systems in place to support research utilization, nor is it often clear who is responsible for ensuring that patient care is based on available and applicable research evidence (Sitzia, 2002; Rutledge & Donaldson, 1995; Omery & Williams, 1999). With an emphasis on economic restraint and the creation of an evidence-based culture within health organizations, administrators often "tack on" research utilization tasks to the role of clinical nurse educators, with little regard for preparatory education or training. Formal orientation and mentorship programs are rare for clinical nurse educators and often their socialization into the role is haphazard and serendipitous (Youngstrom, 1996). Further, the blurring of role boundaries and responsibility between clinical nurse educators, clinical nurse specialists, and research nurses has led to role ambiguity and poor productivity among these specialized groups of nurses (Mackay, 1998; Mateo & Fahje, 1998; Raja-Jones, 2002). Consequently, many challenges face clinical nurse educators who are involved in ensuring that research constitutes the basis for practice. Understanding what is known about the research utilization behaviors of clinical nurse educators is, therefore, an important early step in evaluating the effectiveness of this group of intermediaries who foster evidence-based practice.

In this paper, we summarize the findings of a systematic literature review of the research utilization behaviors of clinical nurse educators. The results are analyzed using the revised *Promoting Action on Research Implementation in Health Services* (PARIHS) framework (Rycroft-Malone et al., 2002). Recommendations are suggested for further study and important implications for research, administration, and education based on the analysis are highlighted.

METHODS

Using selected computerized bibliographic databases a thorough search was conducted (Figure 1). In addition, we hand searched the *Journal for Nurses in Staff Development, Journal of Continuing Education in Nursing,* and *Nursing Education Today* were searched on the assumption that relevant articles might have been missed due to different indexing approaches within the nursing education community, resulting in additional citations. No additional articles, however, were located.

(insert Figure 1 about here)

Sample populations

The initial search revealed few articles that identified clinical nurse educators as a study population and it was thus decided to examine the literature describing the research role responsibilities of clinical nurse specialists and practice developers to determine similarities and differences between these three groups. The characteristics, qualities, and role responsibilities for clinical nurse educators, clinical nurse specialists, and practice developers are diverse (Table 1). Several role functions were discovered to be common to all. These included education, facilitation, clinical expertise, change agent, collaboration, researcher, role model, and consultation. Common research responsibilities included conducting research, disseminating and implementing research findings, liaising between researchers and clinicians, educating staff about the research process, and having research expertise. The only distinguishing feature between the roles was the graduate education requirement for clinical nurse specialists (Ohman, 1996; Raja-Jones, 2002).

(insert Table 1 about here)

Based on this preliminary review, we decided to broaden our criteria to include clinical nurse specialists or nurses with graduate education in the review. We assumed that these groups all have similar responsibilities for teaching, leading, and mentoring others to use research findings in their respective practices.

Inclusion Criteria

The articles were screened using three inclusion criteria. The study had to include clinical nurse educators, clinical nurse specialists, practice development nurses, or nurses with graduate education as the sample population or as a sub-group of nurses for comparison in the sample population. Further, the articles had to include research utilization as a study variable, and an adequate description of an appropriate research design. We reviewed published articles, book chapters, and unpublished doctoral dissertations (English only) by title and abstract that discussed the role characteristics of clinical nurse educators or examined their research utilization behaviors.

The results of the search and retrieval process are summarized in Figure 2. The first author screened 144 articles for inclusion/exclusion. Only research studies were included in the review.

(insert Figure 2 about here)

Data Extraction and Quality Assessment

Twelve articles and one unpublished dissertation met the inclusion criteria. Data were extracted on sample scope and size, theoretical framework used, study design, measurement approach, and findings specific to clinical nurse educators, clinical nurse specialists, and subgroups of nurses with graduate education.

Methodological Evaluation

Quantitative studies were assessed using two separate validity tools, one for descriptive studies and one for correlational studies, with assigned values for items including design, sample, measurement, analyses, and relevance (Appendix). The descriptive tool included 11 items with a total possible score of 11. The correlation studies were evaluated against 16 items for a total possible score of 17. An overall validity rating was assigned for the descriptive (low = 0-4; moderate = 5-8; high = 9-11) and correlational (low = 0-5; moderate = 6-12; high = 13-17) studies following data extraction.

Using the author-generated tool, qualitative studies were assessed based on criteria outlined by Morse (2003) for adjudicating qualitative research proposals (Appendix). Quality assessment components in the tool included theoretical context, rigor, ethics, relevance and contribution. Overall validity ratings were assigned as follows: 0-3 = Low; 4-6 = Moderate; 7 = High. Only those articles with a rating of medium or high from both the qualitative and quantitative types were included in the review.

RESULTS

Articles Included

Thirteen studies were included in the review. One study was an unpublished doctoral dissertation retrieved through Proquest Digital Dissertations. The studies' method characteristics are pictured in Figure 3 with the corresponding number within each category. This figure diagrammatically describes the research studies' contribution to theory development in the field. Descriptive research may tell us less about a

phenomenon than correlational or comparative studies, tempting the researcher to rate exploratory studies lower and unnecessarily excluding them from the review. Keeping the study purpose and level of the research question in mind is important when conducting qualitative assessments (Brink & Wood, 2001). The author generated validity tool was used to assess the appropriateness of the research design to the study purpose and the ability of the results to answer the research question. In this way, the methodological assessment was partially driven by the meaningful contribution of the study findings to concept development and theoretical advancement in a relatively understudied field.

(insert Figure 3 about here)

Quality of Studies

The individual scores and overall validity ratings for the 13 studies included in the review are summarized in Table 2. Overall, study quality ranged from moderate to high. In general, study designs were appropriate to the study purpose and the results answered the research question(s) posed. Limitations common to several studies include data collection through self-report (13), error associated with memory recall (7), conceptualization and definitions of research utilization absent or poorly described (10), underlying assumptions not addressed (10), theoretical framework not identified (7), and no report on instrument reliability and validity testing for instruments used (4).

(insert Tables 2 and 3 about here)

Findings

The characteristics of the 13 studies included in the review are summarized in Table 3. Content analyses revealed eight thematic areas within the context of research

utilization. The categories include: professional characteristics, information seeking behaviors, attitudes and beliefs, awareness of research, involvement in research activities, and contextual factors that influence the use of research. Table 4 contains the results from the descriptive studies and Table 5 the results from the correlational studies.

(insert Tables 4 and 5 about here)

Professional characteristics studied include age, current role, highest education level, clinical specialty, employment status, years of work experience, specialized academic education, and cosmopolite professional activities. Highest level of education was the only determinant that demonstrated a consistent positive effect on research utilization (Table 5). Nurses in leadership roles reported higher research use in two studies but conclusions from these and other findings related to professional characteristics cannot be drawn due to lack of replication.

Investigators measured i*nformation seeking* by examining reading behaviors, attending conferences, and participating in educational activities. Trends in the descriptive results indicate that clinical nurse educators read professional journals more often than other groups of nurses included in the studies (Table 4). Of the behaviors studied, the reading of professional nursing journals was the only behavior with a significant positive relationship with research use (Table 5). Inferring research use from reading behaviors rests on the underlying assumption that clinical nurse educators actually understand what they have read and that they use what they have read to inform their practice.

The studies in which a*ttitudes and beliefs* were examined conceptualized research use in different ways, making it difficult to make comparisons across studies. The

correlations between attitudes measured and research utilization, however, were all significant and positively associated with one another (Table 5). The positive trends noted here are consistent with the findings of others (Estabrooks, Floyd, Scott-Findlay, O'Leary, & Gushta, 2003).

Awareness of research is a difficult concept to measure. The Nursing Practice questionnaire developed by Brett (1987) and adapted by others has been the most widely used instrument for examining the use of evidence-based nursing practices (Table 4). The findings from the studies using this approach reported that clinical nurse educators used the identified practices "sometimes" as a measure of their use of research in clinical practice. Meaningful conclusions are difficult to make from the studies using this approach however, as the inferences drawn from the scoring on the instrument are less than clear (Brett, 1987; Estabrooks, Wallin, & Milner, 2004). Other studies assessed various aspects of research awareness: the examination of protocols purported to be evidence-based (Morin, 1999), knowledge of critique and appraisal criteria (Stetler & DiMaggio, 1991), and confidence using research findings in practice (Barta, 1995; Brown, 1997). Although these findings were mostly descriptive, trends in the results indicate that not all nurses in intermediary roles possess the knowledge and skills to effectively use research findings in practice. Protocols examined were generally not based on current research, nurse specialists had difficultly identifying criteria used for critique and appraisal of research evidence, and 30% of the nurses were not comfortable using research findings in practice.

Some investigators examined *involvement in research* as a measure of research use. Concepts examined included past use/sharing/implementation of research findings,

attitude toward and involvement in research activities, and awareness of research conducted in their nursing units (Tables 4 and 5). The investigators' different conceptualizations of participation in research limit the ability to compare results across studies. Further, the authors do not address the underlying assumption that involvement in research activities infers research use. Hence, meaningful conclusions could not be drawn about involvement in research from the results.

Studies examining *contextual factors* used size of hospital, autonomy in decision-making, existence of policies, and barriers and facilitators of research use as indirect measures of influence on research utilization. Clinical nurse educators rated lack of time and poor access to resources as the highest ranked barriers to research use in their organizations (Table 4). Other less frequently reported barriers include the nurse, organizational and cultural influences, and role ambiguity. Clinical nurse educators reported the need for additional protected time and resources, more education on critique and appraisal, and a culture that supports evidence-based practice to facilitate the use of research in practice. Conclusive results from the remaining influences studied cannot be inferred as they were examined only once.

Summary of findings

In summary, we suggest that higher levels of education, reading professional nursing journals, and positive attitudes may be possible determinants of research use among clinical nurse educators. Further, we wonder if clinical nurse educators possess the necessary skills to use research findings effectively in practice. Clinical nurse educators unanimously agree that lack of time and resources are the highest ranked barriers to research utilization. The studies included described and measured the

individual characteristics and attributes of clinical nurse educators that may be associated with the use of research, but did not examine the effectiveness of clinical nurse educators on the use of research in organizations.

ANALYSIS USING THE PARIHS FRAMEWORK

The *Promoting Action on Research Implementation in Health Services* (PARIHS) framework, originally presented in 1998 (Kitson, Harvey, & McCormack, 1998) and later revised (Rycroft-Malone et al., 2002), is a multidimensional conceptual framework that states successful research implementation is explained as "a function of the relationship between three elements: evidence, context, and facilitation" (p. 174). The PARIHS framework facilitates interpretation of the findings in this paper, as well as locating the state of theory development in the field of research utilization. Findings are discussed in light of its three elements.

Nature of the evidence

The PARIHS framework identifies three types of evidence important for clinical decision-making: 1) research, 2) clinical experience, and 3) patient preferences (Rycroft-Malone et al., 2002). The studies in this review examine the use of research evidence. The authors of the PARIHS framework contend that critical appraisal, which includes understanding research process principles and being able to recognize a well conceived, designed and conducted study, is essential before implementation. Based on the findings of this review, we have suggested that not all clinical nurse educators possess the critical appraisal skills needed to effectively use research findings in practice. Investigators reported a positive correlation between reading behavior and research utilization (Barta, 1992; Michel & Sneed, 1995), but the findings do not indicate whether they understand

what they have read, or if they actually used what they have read in practice. The authors using the Nursing Practice Questionnaire report little use of evidence-based nursing practices, despite being persuaded to the contrary (Barta, 1995; Michel & Sneed, 1995; Berggren, 1996). The findings also reveal that clinical nurse educators with higher levels of education report increased comfort associated with use of research findings (Brown, 1997), suggesting that nurses with higher education levels might have stronger critique and appraisal skills.

The PARIHS framework describes clinical experience, or professional craft knowledge, based on the work of Tichen in (Rycroft-Malone et al., 2002) as "the often tacit and sometimes intuitive knowledge that is embedded in practice" (p. 175). The review shows that clinical nurse educators have many years of experience, providing a rich source of practice knowledge from which to draw.

Context

The PARIHS framework describes the context as "the physical environment in which practice takes place" (Rycroft-Malone et al., 2002, p. 176). A myriad of factors influence cultural values and beliefs within organizations including social, political, economical, historical, and psychosocial forces. Organizations with facilitative innovative cultures commonly manifest values that recognize individual contributions, have decentralized decision-making, a shared vision, role clarity, and quality organizational systems. The findings from the review related to social structures reflect the contextual variables delineated in the PARIHS framework. These include organizational influences such as lack of time and resources, size of hospital, decision

making in the social system, organizational support, and the existence of agency policies for nursing practice innovations.

Although none of the studies examined contextual variables directly, some inferences are suggested based on the findings from the review. Organizational expectations that exceed the clinical nurse educator's ability to accomplish the tasks assigned may be a manifestation of their perceptions of inadequate time and resources for research utilization. Three studies ranked the organization as the top two barriers to the use of research (Barta, 1995; Nilsson Kajermo, Nordstrom, Krusebrant, & Bjorvell, 2000; Pettengill, Gillies, & Clark, 1994). Youngstrom's (1996) finding that authority for decision-making within the social system had a significant effect on research utilization may reflect the importance of decentralized decision-making in innovative organizations.

Research in the field of knowledge utilization has traditionally focused on individual behaviors as predictors of research use, ignoring the organizational factors that influence and mitigate research utilization (Estabrooks, 2003). Our findings illustrate this view and provide fodder for research designs in the future.

Facilitation

The Royal College of Nursing conducted a concept analysis of facilitation and discussed three sub-elements of this component of the PARIHS framework (Rycroft-Malone et al., 2002). They state, "the key to successful facilitation is matching the sub-elements of purpose, role, and skills and attributes to the needs of the situation" (p. 177). Mapping the findings of this review onto the sub-elements, the skills and attributes of the clinical nurse educator role in the facilitation of research utilization are discussed. Concepts that reflect the attributes and skills of clinical nurse educators and other

intermediaries include professional characteristics, information seeking behaviors, attitudes and beliefs, and awareness of research. The PARIHS framework identifies particular attributes needed for effective facilitation: project management, technical, marketing, and experiential credibility for task-oriented facilitation; and co-counseling, critical reflection, giving meaning, flexibility of role, and authenticity engender for holistic facilitation. The attributes of intermediaries from the findings in this review that reflect effective facilitation include positive attitudes, higher levels of education associated with increased use of research, and reading professional journals.

Harvey et al. (2002) identify the necessity of clinical, technical and content credibility for successful facilitation. Examining the number of years worked reported in several studies show that clinical nurse educators have in the range of seven to nineteen years of experience. Credentials needed for clinical nurse educator roles usually include clinical and technical competence, baccalaureate education, and experience and specialized knowledge in the area of practice (Mateo & Fahje, 1998; Krugman, 2003).

Mapping the findings of this review onto facilitation from the PARIHS, the many aspects of facilitation by clinical nurse educators that are assumed, overlooked, or lacking are illustrated. No studies were found in which the clinical nurse educator's ability to facilitate research utilization were assessed. The qualities, skills, and attributes required by clinical nurse educators need to be considered and their effect on research utilization and practice outcomes studied, to understand what is needed for successful facilitation to occur.

DISCUSSION

Clinical nurses educators are not born. They evolve from a strong clinical background and a desire to teach (Kelly-Thomas, 1998). Despite a lack of orientation and mentoring, clinical nurse educators have increased access to resources and more education, both significantly correlated with higher levels of research use (Pettengill et al., 1994; Butler, 1995). Their close association with front-line nursing staff, strong clinical background, and skills and knowledge related to specialized practice are important attributes for the facilitation role articulated by the PARIHS framework.

It is generally accepted that practice developers are poorly trained in critique and appraisal and research implementation, lack support and appropriate resources, and are expected to facilitate the research utilization agenda without adequate supervision, guidance or a strategic plan for its achievement (Kitson et al., 1996). The findings from this review illustrated that intermediaries had difficulty identifying criteria used for critical appraisal (Stetler & DiMaggio, 1991), did not use current research to support the development of protocols (Morin, 1999), and lacked comfort using research findings in practice (Barta, 1995; Brown, 1997).

While the PARIHS framework is somewhat underdeveloped, it provided a framework to map the findings from the review onto the elements of evidence, context, and facilitation. The categorical themes identified in the results, with the exception of contextual factors, represent individual attributes of clinical nurse educators measured primarily through self-report. These attributes inform us about the qualities and skills necessary for enhancing the facilitative aspect of the intermediary role. Positive attitudes toward research, higher levels of education, and the reading of professional journals may

be important precursors to effective facilitation. Traditional approaches to understanding research utilization appear to emphasize the facilitative element described by the PARIHS framework, with specific emphasis on the research component of the evidence used by practitioners. The PARIHS framework prompts consideration of other forms of evidence, such as experience and patient preferences, to inform practice. Estabrooks (2003) has noted the lack of recognition given to experience and social interactions as legitimate sources of knowledge in nursing. No reference to patient preference as a source of evidence in any of the studies reviewed was found.

As noted earlier the contextual factors identified from the review that influence research utilization, with the exception of a few (hospital size, existence of protocols) are essentially proxy measures of the individual perceptions of the barriers to research use in organizations. Researchers need to be cautious when aggregating data collected at the individual level and interpreting it at an organizational level (Hughes & Anderson, 1994). Our findings did not map onto the contextual variables identified in the PARIHS framework.

The diagram in Figure 2 illustrates how the studies from the review contribute to concept development, but little in the way of theory development and nothing toward theory testing. Despite the lack of development of the PARIHS framework, it is a useful theory for understanding how practitioners use research to inform clinical practice. Our findings highlight the emphasis on facilitation by the research to date, but they contribute little toward the development of evidence or context.

Variables important for future study within the context of the PARIHS framework were identified. These include characteristics of facilitators, such as research

knowledge and skills, information seeking behaviors, attitude, role attributes, education, and participation in research. Organizational variables, although not well represented in this review, include social structures (communication and norms of practice), organizational values, and leadership. Characteristics of the research evidence and the application of its importance in light of experience and patient preference need further development and study.

IMPLICATIONS

For Research

It is disconcerting that there are so few studies focusing on clinical nurse educators and other intermediaries with regard to research utilization. As role models for evidence-based nursing practice, individual and organizational determinants of research utilization among clinical nurse educators need to be studied. Measurable components of evidence, context, and facilitation and methodologically sound instruments that measure these elements in a meaningful way need to be developed. Studies examining the research utilization knowledge and skills of clinical nurse educators and their use thereof are important first steps. Intervention studies would assist in the testing of theory on facilitation described by the PARIHS framework. Organizational research that studies the influence of culture, leadership and evaluation on patient outcomes is also essential.

For Administration

Organizations and administrators need to consider clinical nurse educators as links between research and practice to assist in the facilitation of research utilization. Administrators need to evaluate the goals of their organizations in relation to evidence-based practice and, in consultation with intermediaries, determine the educational and

resource needs of this important group of practitioners to enhance their research utilization abilities... Robust orientation and mentorship programs to enhance and develop the facilitative skills of clinical nurse educators are essential if we want to improve their effectiveness in clinical practice.

For Education

Specific education that targets the skills needed for facilitation outlined by the PARIHS framework would be a useful strategy to enhance the clinical nurse educator's ability to use research effectively in practice. Academic educators need to evaluate research curricula of undergraduate and graduate programs and incorporate content specific to research utilization theory. Graduating nurses that have the necessary critique and appraisal skills is a minimum requirement for effective action to increase research utilization. Collaborative mentorship programs between researchers and clinical nurse educators need to be established to enhance awareness of the research process and involvement in research activities. Preceptorship education should also incorporate research utilization content for nurses mentoring students in the clinical setting.

CONCLUSION

The clinical nurse educator is an underestimated resource in organizations in which increasing importance on using research evidence in clinical practice is placed. Clinical nurse educators are in positions of trust and play a critical role in establishing a culture of inquiry in organizations (Krugman, 2003). Our findings show that clinical nurse educators have positive attitudes toward research, an important antecedent for research utilization in practice. Clinical nurse educators nevertheless report a lack of comfort using research in practice and a need for knowledge and skill development in

critical appraisal and research implementation processes. It is critical that clinical nurse educators be supported through mentorship programs and professional development/social networks if their role as facilitators of research utilization is to be enhanced.

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Figure 1 Search Strategy

Bibliographic databases searched included CINAHL (1982 to November 2003), Medline (1986 to November 2003), PsychInfo (1985 to November 2003), ERIC (1986 to November 2003), HSTAR (1987 to October 2003), Dissertation Abstracts (1982 to November 2003), ABI Inform (1985 to November 2003), and Web of Science (1985 to November 2003).

Search terms used:

CINAHL
Clinical nurse educator (textwords)
Staff development instructors (subject heading)
Health educator (subject heading) OR
Clinical nurse specialists (subject heading)
Advanced practice nurses (subject heading)
Practice development (textwords)
Facilitator (textword)

AND

Research utilization (textword)
Knowledge utilization (textword) OR
Diffusion of innovation (subject heading)
Professional practice, evidence-based (subject heading)
Job characteristics

MEDLINE & HSTAR
Nurses (MeSH)
Nurse clinicians (MeSH) OR
Nurse practitioners (MeSH)

AND

Evidence-based medicine (MeSH)
Professional practice (MeSH)
Diffusion of innovation (MeSH)
Research utilization (textword) OR
Staff development (MeSH)
Nursing evaluation research (MeSH)
Job Description (MeSH)

In addition, a manual search of the table of contents of the print version of the journals: *Journal of Nursing Staff Development, Journal of Continuing Nursing Education*, and *Nurse Education Today* was conducted from 2000 to the most current issue available.

Figure 2

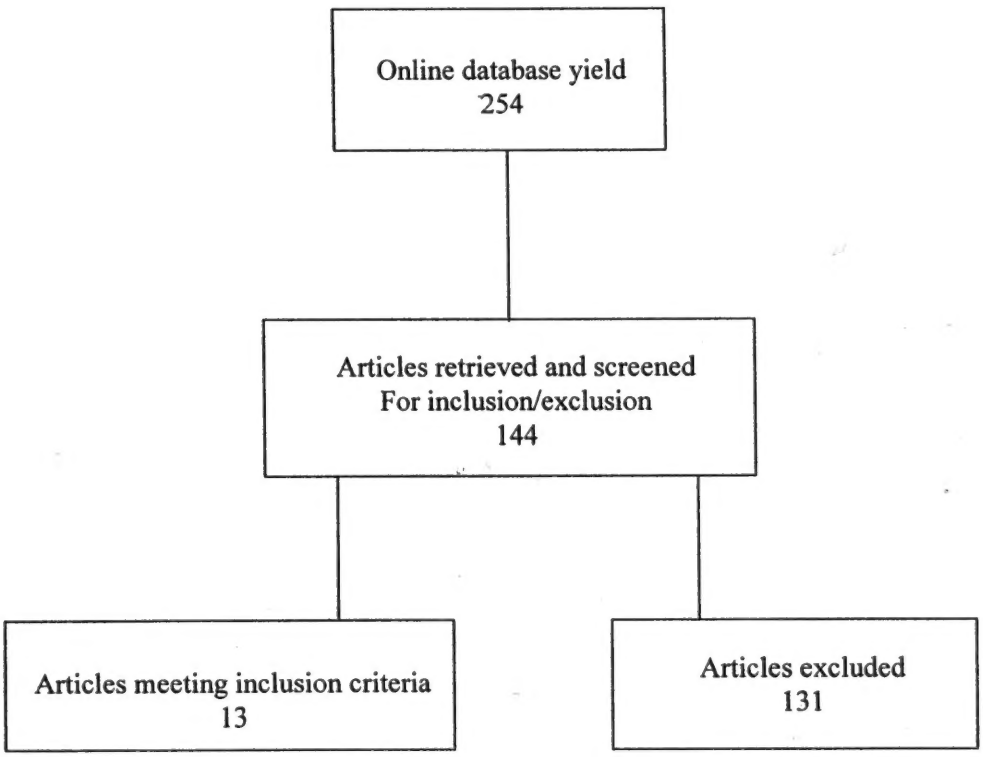
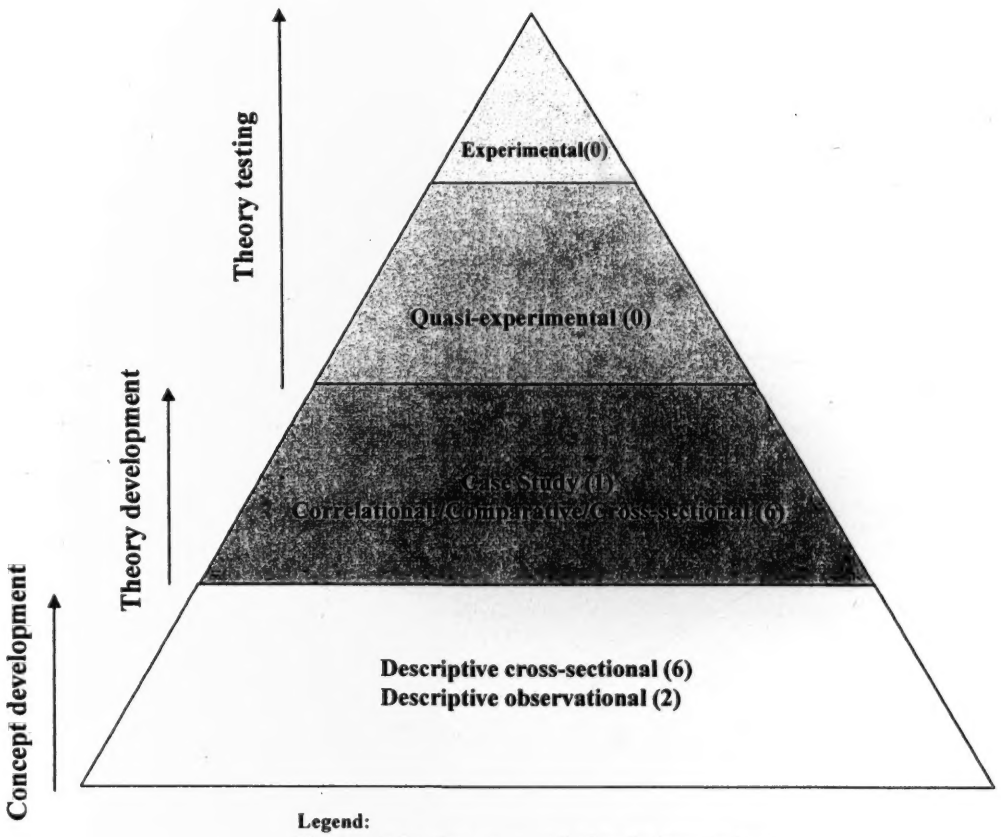

Online database yield
254
Articles retrieved and screened
For inclusion/exclusion
144
Articles meeting inclusion criteria
13
Articles excluded
131

Figure 3 Characteristics of the Method



Legend:
Numbers in brackets represent # of studies from review

Table 1. Characteristics and responsibilities of nursing education and specialist roles related to research utilization

Clinical Nurse Educators/Staff Development Educators	Clinical Nurse Specialists	Practice Developers
Krugman (2003) • Knowledgeable in evolution of nursing research and EBP • Creation of a learning environment • Research acquisition and appraisal skills • Educate staff nurses on research inquiry skills • Establish journal clubs • Mentoring quality improvement projects Mateo & Fahje (1998) • Clinical and professional development of staff • Facilitation • Education • Delegation • Negotiation/conflict management expertise • Political savvy • Clinical expertise • Leadership Mottola (1996) • Facilitator of research utilization • Education of staff re research process • Role model • Change agent • Fosters autonomy • Link b/w administrators and practitioners Tuohig & Oleson (1995) • Facilitation • Collaboration • Education • Research expertise • Communication • Data Collection Davis (1990) • Researchers • Staff advocates • Resource link b/w staff and researchers • Resource link b/w hospitals and external	Raja-Jones (2002) • Administrator • Educator • Clinician • Consultant • Researcher • Graduate level education McGuire & Hardwood (2000) • Dissemination and acquisition of research findings • Evaluation and merit of research clinical applicability • Incorporation of findings into practice • Evaluation of research-based practice • Socialization Scott (1999) • Change agent – developing and implementing evidence-based protocols • Facilitating research utilization in practice • Using research findings in practice • Disseminating research to staff nurses • Conducting research • Research collaboration • Presentation of research findings at conferences • Quality improvement activities Mackay (1998) • Facilitator • Opinion leader/ research champion • Change agent • Liaison b/w researcher and clinician • Conduit of knowledge Ohman (1996) • Identifies problems,	McCormack & Garbett (2003) • Promote and facilitate change • Translation and communication • Respond to external influences • Education • Implementation of research into practice • Audit and quality activities (development of policies and guidelines) Garbett & McCormack (2001) • Coordination • Develop skills and knowledge of individuals • Facilitates personal, professional, and cultural development • Education and training • Clinically credible based on relevant experience

agencies • Role model for expert practice • Consultant	seeks out resources, disseminates research findings in clinical practice • Collaborator • Clinical practitioner • Consultant • Educator	

Table 2 Validity Scores

Author (year)	Validity score	Final Rating	Design	Sample	*Measurement*	*Analysis*	*Relevance*
Quantitative (Descriptive)	(/11)		(/2)	(/5)	(/1)	(/1)	(/2)
Humphris, D., et al. (1999) Practical Diabetes International	8	Mod	1	5	0	0	2
Nilsson Kajermo N., et al. (2000) Journal of Advanced Nursing	9	Hi	1	4	1	1	2
Pettengill, M. M., et al. (1994) Image: The Journal of Nursing Scholarship	10	Hi	1	5	1	1	2
Quantitative (Descriptive Correlational)	(/17)		(2)	(/5)	(/6)	(/2)	(/2)
Barta, K. M. (1995) Journal of Professional Nursing	10	Mod	1	3	4	0	2
Berggren, A. C. (1996) Journal of Advanced Nursing	9	Mod	1	4	1	1	2
Brown, D. S. (1997) Journal of Continuing Education in Nursing	8	Mod	1	3	2	1	1
Butler, L. (1995) Canadian Journal of Nursing Research	10	Mod	2	2	3	1	2
Hatcher S., & Tranmer J. (1997) Canadian Journal of Nursing Administration	6	Mod	1	2	1	1	1

Author (year)	Validity score	Final Rating	Design	Sample	*Measurement*	*Analysis*	*Relevance*
Michel, Y., & Sneed, N. V. (1995) Journal of Professional Nursing	12	Hi	1	4	4	1	2
Youngstrom, L. (1996) Dissertation Abstracts International	14	Hi	1	5	4	2	2
Qualitative	(0-7)	(Low – High)	Theoretical context (/2)	Rigor/ethics (/3)	Relevance (/1)	Contribution (/1)	
Morin K. H., et al. (1999) Clinical Nurse Specialist	6	Mod	2	2	1	1	
McCormack & Garbett (2003) Journal of Clinical Nursing	7	Hi	2	3	1	1	
Stetler, C. B., & DiMaggio, G. (1991) Clinical Nurse Specialist	4	Mod	1	2	0	1	

Table 3 Characteristic of Included Studies

	Author (s) and year	Sample Size	Subjects	Framework	Study Design	Measurement	Reliability	Validity
1.	Barta (1995)	213	Pediatric nurse educators (academic)	Rogers' Theory of Diffusion	Descriptive	Modified Nursing Practice Questionnaire-Education (Brett, 1987) Barriers Scale (Funk et al., 1991)	Overall α =0.74	Appropriateness of the nursing practices described as content validity
2.	Berggren (1996)	84	Midwives	Rogers' Theory of Diffusion	Descriptive	*Midwife Practice Questionnaire - Modified NPQ* (Champion & Leach, 1989)	Overall α =0.79	Appropriateness of the nursing practices described as content validity
3.	Brown (1997)	246 507	Registered nurses in leadership and educational roles Registered nurses	Not specified	Descriptive correlational	Questionnaire	Not reported	Not reported
4.	Butler (1995)	59 482	CNEs and CNSs Registered nurses	Not specified	Descriptive comparative	The Research Survey (Wells & Braggs, 1994)	Not reported	Not reported

	Author (s) and year	Sample Size	Subjects	Framework	Study Design	Measurement	Reliability	Validity
5.	Hatcher & Tranmer (1997)	37 137	Registered nurses in leadership and educational roles Registered nurses	Not specified	Descriptive correlational	Research Utilization Questionnaire (Champion & Leach, 1989)	Sub-scale α = 0.84-0.94	Not reported
6.	Humphris et al. (1999)	298 133	Diabetes nurse specialists Registered nurses	Not specified	Descriptive	Research Utilization Questionnaire* (Champion & Leach, 1989)	Not reported	Not reported
7.	McCormack & Garbett (2003)	60 25	Practice developers Registered nurses	Not specified	Concept development	Literature review, focus groups and individual semi-structured telephone interviews	Not applicable	Not applicable
8.	Michel & Sneed (1995)	157	Registered nurses from Sigma Theta Tau chapter	Rogers' Theory of Diffusion	Descriptive correlational	Modified Nursing Practice Questionnaire (Brett, 1987)	Sub-scale α = 0.73-0.84 Overall α =0.85	Appropriateness of the nursing practices described as content validity
9.	Morin et al. (1999)	32	Nurse educators and specialists	Not specified	Descriptive	Semi-structured interviews	Not applicable	Content by panel

	Author (s) and year	Sample Size	Subjects	Framework	Study Design	Measurement	Reliability	Validity
10.	Nilsson Kajermo et al. (2000)	37 166 33 127 237	Nurse teachers (academic) Nursing students Nurse Administrators Physicians Registered nurses	Rogers' Theory of Diffusion	Descriptive correlational	The Barriers Scale (Funk et al., 1991)	Sub-scale α = 0.81-0.87	Face and content reported by Funk
11.	Pettengill et al. (1994)	182 222	Nurse educators (academic) Registered nurses	Rogers' Theory of Diffusion	Descriptive	Factors Encouraging and Discouraging the Use of Research Findings Questionnaire	Not reported	Content by panel
12.	Stetler and DiMaggio (1991)	24	Clinical Nurse Specialists	Not specified	Descriptive	Semi-structured interviews	Not applicable	Content by panel
13.	Youngstrom (1996)	40	Nursing staff development educators	Roger's theory of diffusion	Descriptive correlational	Questionnaire	Test-retest = 0.87	Content by pilot testing and peer review

Table 4 Summary of Findings (Descriptive Results)

Attribute	Source	Instrument	Scoring	Finding
Quantitative Studies				
Awareness of research (innovation)	Barta (1995)	Nursing Practice Questionnaire – Educators (Brett) 7 questions on 14 specific practices	Total Mean Innovation Adoption Score 0.0-0.49=unaware 0.50-1.49=aware 1.5-2.49=persuaded 2.5-3.49=use sometimes 3.5-4.0=use always	2.98 (stage of implementation)
	Berggren (1996)	Nursing Practice Questionnaire – Midwives (Brett) 7 questions on 14 specific practices	Total Mean Innovation Adoption Score 0.0-0.49=unaware 0.50-1.49=aware 1.5-2.49=persuaded 2.5-3.49=use sometimes 3.5-4.0=use always	2.06 (stage of persuasion)
	Michel & Sneed (1995)	Nursing Practice Questionnaire - modified (Brett) 7 questions on 5 specific practices	Total Mean Innovation Adoption Score 0.0-0.49=unaware 0.50-1.49=aware 1.5-2.49=persuaded 2.5-3.49=use sometimes 3.5-4.0=use always	2.21 (stage of persuasion)
	Humphris et al. (1999)	Questionnaire	Greatest to least percentage reporting yes (top five)	Reading professional journals (94%)
Attitude toward research	Humphris et al. (1999)	Research Utilization Questionnaire (Champion and Leach)	Attitude toward research utilization (5 point scale from strongly agree to strongly disagree)	Stated was generally positive (no score reported)

Attribute	Source	Instrument	Scoring	Finding
	Brown (1997)	Questionnaire	Comfort level using research in practice (3 point scale from not comfortable to comfortable)	Not comfortable=29% Comfortable=53% Very comfortable=18%
Barriers	Barta (1995)	Barriers Scale (Funk et al.)	List of barriers (ranking greatest to least)	Nurse Organization Communication Research
	Nilsson Kajermo et al. (2000)	Barriers Scale (Funk et al.)	List of barriers (ranking greatest to least)	Organization Communication Nurse Research
	Pettengill et al. (1994)	Factors Encouraging and Discouraging the Use of Nursing Research Findings Questionnaire	List of barriers (ranking greatest to least)	Discouragers: Lack of time Lack of administrative support Lack of interest from nursing staff Encouragers: Methods to keep informed Monthly research newsletters
	Humphris et al. (1999)	Questionnaire	List of barriers – top five (ranking greatest to least)	Workload pressures Time Lack of staff Lack of interest Lack of authority
Participation in research activities	Pettengill et al. (1994)	Questions regarding involvement in specific research activities (yes/no)	List of activities – top five (ranking greatest to least)	Read completed nursing research studies (90%) Share findings with nurses (81%) Read nursing research projects (79%) Assist with nursing project (64%) Analyze data (61%)

Attribute	Source	Instrument	Scoring	Finding
	Humphris et al. (1999)	Questionnaire	List of activities – top five (percentage reporting yes)	Sharing findings with nurse colleagues (89%) Participating in clinical audit (80%) Sharing findings with other professional colleagues (76%) Implementing findings in practice (74%)
	Brown (197)	Questionnaire	List of activities – top five (percentage reporting yes) Applying findings in practice (4 point scale from not interested to very interested)	Collected data (77%) Applied findings in practice (69%) Analyzed or interpreted data (63%) Served as a subject for a study (54%) *Took a nursing research class (49%)* Very interested= 86%

Attribute	Source	Method	Analyses	Findings
Qualitative Studies				
Professional characteristics	McCormack & Garbett (2003)	Literature review Focus groups Interviews	Content analysis	Literature review – much emphasis on transferring research to practice. Focus groups and interviews – very few reported that dissemination of research was part of role.
Awareness of research	Morin (1999)	Interviews	Content analysis	The majority of ARN's reported that protocols were based on research but examination of protocols revealed no research base or references based on textbook and standards evidence only.
	Stetler & DiMaggio (1991)	Interviews	Content analysis	CNS's most often use research findings conceptually; case study examples indicate both conceptual and instrumental use.

Attribute	Source	Method	Analyses	Findings
				Primary sources of knowledge are nursing journals (many that are not based on research), peers, and attending conferences. Half the subjects could not identify explicit criteria for evaluation of applicability of findings to practice.

Validity Assessment Tool Qualitative Studies	
Criteria	**Criteria met? (yes =1; no=0)**
Literature Review • Comprehensive, synthesized • Philosophical framework used	
Use of a theoretical context/framework	
Design • Adequately described/compatible with purpose • Adherence to methodological assumptions • Ethics – protection of subjects	
Sample • Theoretically driven • Characteristics identified • Adequate for saturation • Research context appropriate	
Analysis • Strategies appropriate to purpose and findings • Connections between data, interpretations and literature	
Findings • Understandable, clearly presented • Placed in context	
Implications • Reflect findings • Significance • Recommendations	
Total score	/7
Overall Rating (Key: 0-3=Low; 4-6=Moderate; 7=High)	

Paper #2 – Clinical nurse educators as agents for change: Increasing research utilization in nursing practice

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Clinical nurse educators as agents for change: Increasing research utilization in nursing practice

In a culture that espouses the merits of achieving best practice, policy-makers, researchers, and granting agencies search for ways to promote the use of research evidence in health organizations. Early research, such as the classic Iowa hybrid corn study conducted by Ryan and Gross (1943), highlighted the importance of interpersonal networks in the diffusion of an innovation within a social system. Organizational theorists have tried to explain the social nature of knowledge, how it travels in organizations, and the human elements that influence its movement (Orlikowski, 2002). In social science theory, investigators conceptualize knowledge within different practice communities and explore the networks that enhance the communication of knowledge between these communities in organizations (Knorr Cetina, 1991; Dunn, 1980). The influence of social relationships on knowledge transfer suggested by these theoretical perspectives sets the stage for examining the role of "intermediaries" in nursing. Clinical nurse educators and other intermediaries, such as clinical nurse specialists and practice developers, bridge the communities of research and clinical practice. The primary goal for clinical nurse educators is the facilitation of professional development of practicing nurses. Responsibilities include promoting best practice by mentoring others, acting as an information source, and assisting in the development of policies and procedures based on available research evidence. Clinical nurse educators often evolve into their roles largely due to their clinical expertise and a desire to teach (Kelly-Thomas, 1998). As trusted and credible members of the nursing practice community, clinical nurse educators are ideally positioned to facilitate research utilization in organizations.

We thought it was useful to study the research utilization behaviors of clinical nurse educators. We hoped this would enhance our understanding the needs of clinical nurse educators and assist in the design of strategies to improve the appropriate and effective use of research findings in clinical nursing practice.

Review

We conducted a review to assess the state of knowledge on research utilization and "intermediaries" working in clinical nursing roles. Intermediaries include clinical nurse educators, staff development educators, clinical nurse specialists, and practice developers. We found few studies that assessed research utilization and nurse educators. Most of the research conducted to date has studied academic nurse educators rather than educators working in clinical roles. Some studies report the positive influence of clinical nurse educators on the practice knowledge of staff nurses in diabetic outpatient teaching and emergency settings (Adams & Cook, 1994; Considine & Hood, 2000) but no studies were found that measured the impact of clinical nurse educators on research utilization. However, many authors underline the suitability of nurses in intermediary roles to facilitate research utilization in clinical practice settings (Carroll et al., 1977; DeBourgh, 2001; Krugman, 2003) despite the dearth of evidence to support such an assumption. Furthermore, researchers report that nurses in intermediary positions are ill-prepared to fulfill the research aspect of their roles (Maeve, 1994; Clarke & Procter, 1999), nor do they feel comfortable using research findings in practice (Butler, 1995; Brown, 1997). Practice developers and staff nurses did not identify research utilization as a perceived responsibility of the practice development role (Raja-Jones, 2002; McCormack & Garbett, 2003).

The principle approach taken by researchers in the study of intermediaries and research utilization is by cross-sectional survey design, and to a lesser extent with qualitative methods. Common individual variables studied and conceptualized as determinants of research utilization include current role, reading behavior, sources of information, social/professional networks, level of education, attitude and beliefs, research involvement, and professional and socioeconomic characteristics. Others have studied organizational determinants, including social and practice norms, autonomy in decision-making, and size of hospital (Pettengill, 1994; Barta, 1995; Youngstrom, 1996; Humphris, 1999; Nilsson-Kajermo, 2000). Attitude toward research and highest level of education are the only individual determinants in these studies demonstrating a consistent positive effect on research utilization by educators (Butler, 1995; Michel & Sneed, 1995; Youngstrom, 1996; Brown, 1997; Hatcher & Tranmer, 1997). Other determinants demonstrating significant positive effects on research utilization include current leadership role (Butler, 1995; Hatcher & Tranmer, 1997), specialized academic education, cosmopolite professional activities (Youngstrom, 1996), reading nursing journals (Barta, 1995; Michel & Sneed, 1995), attending conferences, awareness of an agency policy for nursing practice innovations (Michel & Sneed, 1995), and size of hospital (Youngstrom, 1996). Inconsistencies in the measurement of variables across studies and the assessment of determinants in only one or two instances make it difficult to compare results or to draw conclusions from these findings.

In these studies, investigators have frequently used the Nursing Practice Questionnaire (Brett, 1987) to study research utilization. This instrument measures the stage of innovation adoption of specified nursing practices based on diffusion of

innovation theory (Rogers, 1995). The studies conducted on specialist and academic nurses reported mean innovation adoption scores at the level of persuasion, (Michel & Sneed, 1995; Berggren, 1996) and at the level of implementation (use sometimes) for nurses with university degrees (Youngstrom, 1996) and for pediatric nurse academic educators (Barta, 1995).

Some researchers have approached the study of research utilization by asking about the barriers and facilitators to research use and ranking them in order of priority. Nurses in educator, specialist, and leadership roles reported lack of protected time and lack of resources to access research as the highest ranked barriers in their organizations (Pettengill, Gillies, & Clark, 1994; Humphris, Hamilton, O'Halloran, Fisher, & Littlejohns, 1999). This is consistent with other findings reported in the literature with other groups of nurses (Champion & Leach, 1989; Lacey, 1994; Varcoe & Hilton, 1995; Estabrooks, 1999a; 1999b).

In summary, research that examines clinical nurse educators and research utilization is scarce, despite the positioning of these nurses as trusted, knowledgeable, and influential members in health organizations. It is disconcerting that intervention studies involving opinion leaders, academic detailers, and change agents on the use of research in the medicine are so numerous (Oxman, Thomson, Davis, & Haynes, 1995; Bero et al., 1998; Thomson O'Brien et al., 2000; Grimshaw et al., 2004) while there are so few in nursing. Clearly, this is an area needing further study.

This study explores the determinants of research utilization among a group of nurses using Rogers' (1995) diffusion of innovation theory as a framework to guide the selection of variables for inclusion. The variables included in the study are research

utilization, age, research awareness, attitude toward research, adoptiveness, localite, cosmopolite, mass media, innovations, involvement in research, traditional norms, regional size, highest education level, and nurse role.

Based on the findings from the literature review and theory related to innovation diffusion, we hypothesized that university-prepared clinical nurse educators with increased exposure to mass media and innovations (research) that are readily understood, higher levels of awareness, attitude, adoptiveness, localite and cosmopolite communication and involvement in research would have higher levels of research use. We assumed that clinical nurse educators would have higher research utilization scores because they have better access to technical resources, stronger social networks, and more research awareness and critique and appraisal skills. We hoped that the findings would assist in developing strategies to enhance the effectiveness of clinical nurse educators to facilitate research utilization in health organizations.

Purpose

The purpose of this study was to explore the relationships between characteristics of clinical nurse educators and research utilization. The study objectives were:

1) to describe the demographic and professional characteristics of clinical nurse educators and compare research utilization scores between educators, staff nurses and managers,

2) to model the determinants of research utilization among nurses by role and level of education, and

3) to explore the differences between overall, instrumental, conceptual, and symbolic research utilization.

Theoretical Framework

We used Rogers' (1995) diffusion of innovation theory as a framework for the study. It provided guidance for the literature review, the selection of study variables, and the analyses. Many authors have used this theory to study research utilization in nursing (Brett, 1987; Winter, 1990; Michel & Sneed, 1995; Rogers, 2000). The fifth phase of the innovation development process frames our study. Each of the variables included in our predictive model of research utilization are latent concepts of the elements of diffusion and the elements of adoption (Figure1). As others have done in nursing, we are assuming that research utilization is equivalent to innovation diffusion where research findings are construed as innovations with a research base to substantiate them.

(insert Figure 1 about here)

Some authors have conceptualized research utilization as instrumental, conceptual, and symbolic (Beyer & Trice, 1982; Stetler, 1994; Estabrooks, 1999a). *Instrumental* research utilization is the concrete application of research findings to make a decision or direct an intervention. The translation of the research into a tangible form, such as a policy, protocol, or guideline is often evident (Estabrooks, 1999a). *Conceptual* research utilization can inform or increase awareness of the research, changing the way an individual thinks about a particular topic or issue. This indirect use of research may influence action but in less tangible ways than instrumental use (Beyer & Trice, 1982). *Symbolic* research utilization is the use of research to "gain legitimacy" or to influence the opinions or views of others on a particular issue (Hasenfeld & Rino, 1992).

Method

Design

The findings reported here are a result of analyses conducted on the Alberta Nurse Survey (Estabrooks, Chong, & Birdsell, 2003). This survey is an extension of a national study on the utilization of health research results in Canada (Landry, Amara, & Lamari, 2001). The Alberta extension received ethical clearance from following bodies: University of Alberta Health Research Ethics Board, University of Calgary Conjoint Ethics Board, Community Health Research Ethics Review Board, and the Chinook Health Region. The analyses for this study further received ethical clearance from the University of Alberta Health Research Ethics Board.

Sample

The target population of the Alberta Survey included nurses registered with the Alberta Association of Registered Nurses (AARN) who had consented to participate in research activities on their 2002 AARN registration renewal application. The researchers stratified the sample by role: staff nurse, educator[1], manager; and by regional size: urban, small urban, rural. Initial quotas were established (50 cases per cell) and cells with less than 50 cases from the initial sample pool had maximum total numbers assigned. Using random sampling method for data collection from the initial pool, 389 participants completed the survey. The response rate percentages for the staff nurses, educators, and managers were 84%, 90.4%, and 88.9%, respectively.

Data Collection

In the extension, the University of Alberta Population Research Laboratory

[1] Clinical Nurse Specialist **or** Instructor/Professor/Educator **and** work in either Teaching Employees or Teaching Patients/Clients **and not** University or College.

(PRL), using Computer-Assisted Telephone Interviewing (CATI) collected the survey data in 2002. The survey was pilot-tested and adjustments made, based on feedback from the interviewers and in collaboration with the principal investigators, before the collection of data. The PRL processed and cleaned the data simultaneously with the data collection phase. Details of the data collection methods, data processing and cleaning are reported elsewhere (Estabrooks, Chong, & Birdsell, 2003).

Measures

We chose fourteen independent variables for inclusion in our model, based on the recommended ratio of cases to independent variable (30 cases/variable) and estimating a small effect size for the dependent variable (Tabachnick & Fidell, 1996). Complete descriptions of the independent and dependent variables are located in Table 1. We derived the variables from the survey questions to measure the concepts of interest. The final score for each of the variable indices are summations of a Likert scale (measured on an ordinal scale of 1-5) with one exception. *Involvement* was the sum of scores on a nominal scale with greater weights applied dependent upon the level of involvement in a research activity. The range of scores and mean reported values vary depending on the number of indicators used. Table 1 reports the score ranges for all variables and alpha coefficients for the variable indices with multiple indicators. Assuming the distances between the ordinal values on the Likert scale are equidistant, we used the mean reported values for the single item variables in the analyses. We measured research utilization in four different ways. We wanted to test the assertion that these forms of research utilization are different from one another (Estabrooks, 1999a) so decided to include them

in addition to overall research use in the analysis. The interviewers provided examples of each of the types of research utilization in the survey to assist participants in understanding the conceptual differences. We asked the participants about their overall research use on two separate occasions in the survey, once before and once after the questions about instrumental, conceptual and symbolic research utilization. Since we could not be sure which of the scores on the overall research utilization variable would be more accurate, we decided to use the average between the means as the measure for overall research.

(insert Table 1 about here)

Data Analysis

We analyzed the data using SPSS® 12.0 for Windows™. We categorized the sample into three groups: educators, staff nurses, and managers. By examining the nurses by group, we assumed that research utilization may be role-driven (e.g. research utilization is an expectation of simply being in the role), or that nursing role may act as a surrogate for other determinants (e.g. critical thinking, personality). Using univariate statistics, we examined the independent and dependent variable scores to assess the distribution, measures of central tendency, and variability of the cases for the groups and entire sample. We compared the means of the independent and dependent variable scores using ANOVA and the Tukey post hoc test to determine the similarities and differences between the groups by role and regional size. We then examined the variable scores using bivariate statistics to assess the strength of association between the independent and dependent variables. Only variables that met the assumptions of normality, linearity,

and homoscedasticity were included in the model[2]. Finally, we ran four separate linear regressions to determine which variables predicted the four types of research utilization.

Results

There were 82 clinical nurse educators in the total sample. Of these, 60 were instructors of staff or patients; nine were clinical nurse specialists, and the remaining 13 were employed in research, advanced nursing, or consultant roles where teaching others consumed a major portion (>50%) of their time. We report the findings of this study by the objectives outlined in the purpose.

Objective #1: To describe the demographic and professional characteristics of clinical nurse educators and compare research utilization mean scores between educators, staff nurses and managers.

(insert Tables 2 and 3 about here)

We have provided a summary of the demographic and professional characteristics by nurse group in Table 2. Attributes included are regional size, level of education, employment status and primary work setting. We summarized analysis of variance testing results with significant mean differences between groups on the dependent and independent variables in Table 3. Clinical nurse educators' mean scores were higher than staff nurses and managers for all research utilization measures. Subsequent post hoc multiple comparisons show that clinical nurse educators are distinct from staff nurses and managers on measures of overall, instrumental, and conceptual research utilization. Clinical nurse educators are homogenous with managers for

[2] Gender and current enrollment in university were not normally distributed and were dropped from the model prior to analysis.

symbolic research utilization. Clinical nurse educators also scored higher on average than the other groups on measures of attitude, awareness, adoptiveness, and cosmopolite communication. Clinical nurse educators are distinct from staff nurses and managers on attitude, awareness, and cosmopolite and homogenous with managers on adoptiveness, localite communication, and involvement in research.

Objective #2: To model the determinants of overall research utilization [Overall RU] among nurses by role.

(Insert Tables 4 and 5 about here)

To achieve results to meet this objective, we used a dummy encoded variable for nursing role to represent membership in each of the nursing groups. We also created a dummy encoded variable for level of education. The creation of these dummy variables now allowed us to represent categorical information for nurse role and level of education for the analyses. We chose the clinical nurse educator with a degree as the reference group (constant) in the final regression model because this group of nurses was the focal interest of the study.

We reported the Pearson's product moment correlations for the independent and dependent variables in Table 4. We found a significant relationship between age, awareness, adoptiveness, attitude, cosmopoliteness, innovation, involvement, educators, and staff nurses, diploma, degree, and *overall* research utilization. Localite, mass media, traditional norms, and managers were not significantly associated with overall research utilization.

Although the linear fit for the first regression model predicting overall research utilization was modest (R^2=39%), we did find significant coefficients for *overall*

research utilization (Table 5). The significant coefficients for *overall* research utilization include dummy variables representing educators with a degree (constant), age, attitude, awareness, involvement, and managers (dummy). Changing scores on predictors in the model such as improving attitude, increasing the frequency of use of information sources that are research based, and increasing involvement in research activities, will increase the predicted value of overall research utilization among nurses. The coefficients for age and managers were negative. This means that the greater your age, the more you subtract from the predicted research utilization score. Being a manager also detracts from the predicted overall research utilization score.

Objective #3. To explore the differences between overall, instrumental, conceptual, and symbolic research utilization.

The following statements summarize the differences found between the four regression models:

- The dummy variable for educators with a degree had a significant coefficient for overall, instrumental, and conceptual research utilization but not for symbolic research utilization.
- The coefficient for age was significant for overall research utilization only (inverse relationship).
- The coefficient for attitude and awareness was significant for overall, instrumental, and symbolic research utilization but not for conceptual research utilization.
- The coefficient for localite was significant for conceptual research utilization only.

- The coefficient for mass media was significant for symbolic research utilization only.
- The coefficient for involvement was significant for overall, instrumental, and symbolic research utilization but not for conceptual research utilization.
- The coefficient for managers (dummy) was significant for overall and conceptual research (inverse relationship).
- The coefficient for staff nurses was significant for conceptual and symbolic research utilization (inverse relationship).

The reported R^2 for each form of research utilization was modest and ranged from 14% to 39% (see Table 5). Model fit was significant for overall (F (14,355) = 17.88, $p <$ .000), instrumental (F (14,355) = 5.33, $p <$ .000), conceptual (F (14,355) = 5.89, $p <$ .000), and symbolic research utilization (F (14,355) = 10.17, $p <$ .000). Examination of the residual scores revealed that they were linear and normally distributed about the mean of zero.

We performed a post-hoc power analysis using PASS 2002™ to assess our ability to find significant relationships that are present, a strategy suggested when non-significant results are obtained to corroborate conclusions and minimize the risk of committing a Type II error (Polit & Sherman, 1990). The results of the power analysis for *overall* research utilization are reported in Table 6. Our sample size (N=388) achieved 77-100% power to detect the associated R^2 values using an F-Test with a significance alpha of 0.05, showing support for the significant regression coefficients reported in Table 5.

(Insert Table 6 about here)

Discussion

Awareness, attitude and involvement consistently predicated overall, instrumental, and symbolic research utilization. Being a manager or staff nurse detracted from all predicted research utilization scores, indicating their lower levels of research use as compared to those of educators. Although the variables encompassing communication (localite, cosmopolite, and mass media) did not predict overall research utilization in the first model (Table 5), the correlations show corresponding relationships between all forms of research utilization and cosmopoliteness (Table 4). The failure of these communication variables in our model to predict overall research utilization in our first model may be due to small sample size or error associated with inadequacy of the indicators to accurately measure the variables of interest. We suggest that these communication variables need future study using larger samples.

Innovation diffusion theory

The major premise of diffusion of innovations theory is to understand the many factors that influence change in a variety of contexts (Rogers, 1995). Diffusion of innovations theory has reasonable utility for studying clinical nurse educators and research utilization. Clinical nurse educators and other nursing intermediaries are key agents for change in health care organizations. Bero et al. (1998), in a review of strategies for promoting the implementation of research findings, suggest that face-to face exchanges with influential and trusted role models, particularly those that hold membership within the community targeted for change, is the most effective communication strategy.

The communication elements of innovation diffusion theory are markedly similar to community of practice theory, examined from a social-practice perspective. Brown & Duguid (2001) suggest, "knowledge travels along networks that are built by practice" (p. 209). The authors argue that explicit knowledge takes on an implicit dimension as it diffuses through organizations and it is practice that "underpins its successful circulation" (p.204). They theorized that the travel of knowledge inside organizations is dependent upon the degree to which members of different practice communities communicate and understand each other. Translated to this context, members of a nursing practice community may have difficulty communicating with members of a research practice community. Similarly, in diffusion of innovations theory, Rogers (1995) points out that opinion leaders and change agents have more success communicating new ideas in organizations when the agents have membership within the same group or community as those they are trying to influence. Members that move from one practice community to another, usually through promotion or career change, can become "translators" or linking agents between different practice communities. Clinical nurse educators often function in these "knowledge brokering" roles between staff nurses and administrators, and between researchers and clinicians.

We can relate this discussion to a persistent theme in the knowledge utilization literature, the "two-communities metaphor" (Caplan, 1979; Snow, 1993). In nursing, we have frequently described the space between the two communities as the "theory-practice gap". Several reasons for this gap have been suggested including cultural differences, means and ends differences, and communication failure, among others (Caplan, 1979). Larsen, Adamsen, Bjerregaard, & Madsen (2002) posit that the theory-

practice gap is essentially a social construction and that in reality no such gap really exists. They believe that practice knowledge and research knowledge follow their own logic and as such, are two different forms in their own right. As they have separate purposes, these two forms of knowledge are distinct and are not dependent upon one another. Thus, they argue, no such gap exists. The earlier discussion of community practice theory Brown & Duguid, (2001) suggests that theory is enacted in practice and that theory and practice are essentially inseparable. Innovation diffusion theory supports this view. Rogers (1995) argues that many innovations are "reinvented" as they are taken up in practice and contextualized to accommodate the environmental and cultural differences from where they originated. Our findings show that awareness of research, attitude, and involvement in research predict instrumental research utilization. As instrumental research utilization measures the *direct* application of research findings in *practice*, the model infers that nurses, especially educators, with positive attitudes and high levels of research awareness, that are involved in research activities predict instrumental research use. This may be an illustration of the research findings being enacted in practice, lending support for the existence of a gap. The ability of clinical nurse educators to use their knowledge and experience to contextualize research findings for use in practice may be the reason for their increased use of research generally.

Clinical nurse educators and research utilization

Controlling for the effects of variables in the model, clinical nurse educators with a degree (constant) has a significant coefficient for overall, instrumental, and conceptual research utilization. Others have reported current role (leadership) as a determinant of research utilization (Butler, 1995; Hatcher & Tranmer, 1997). We attributed possible

reasons for this to include: expectation of the role to use research as a basis for practice, higher levels of education, more positive attitudes, and increased access to resources that enhance awareness of research findings. Our findings showed that having a diploma education did not influence the predicted values of any form of research utilization. While others have found education to be a predictor of research utilization, perhaps distinguishing between undergraduate and graduate levels would have shown different results in these analyses. Clinical nurse educators had significantly higher scores on awareness, attitude, and involvement than the staff nurses and managers (Table 3). Awareness, defined as the frequency with which individuals access information sources with a strong research base to support them, is a precursory skill for critique and appraisal. While the results are not a direct measure of the *ability* of clinical nurse educators to critique and appraise the literature, such findings may allow us to infer that if they are accessing these information sources, they are also reading and understanding, at some undetermined level, the articles retrieved. Educators also have more opportunity to become involved in research activities than nurses in other roles do. These activities may include quality assurance audits, data collection, and project evaluations. Educators also had positive attitudes toward research, supporting the findings of others previously mentioned.

The coefficient for educators (constant) in the model for symbolic research utilization was not significant (see Table 5). Symbolic research utilization is the use of research to persuade others to change practice or influence policy. Youngstrom (1996) reported decision-making power in the social system predicted research utilization of staff development educators. Upton (1998) noted that lack of professional autonomy

limits nurses' ability to use research to inform clinical decision-making when positing reasons for the theory-practice gap. Perhaps this lack of perceived autonomy discourages clinical nurse educators from using research in this persuasive way.

Clinical nurse educators differ from staff nurses and managers in their research utilization behaviors. We conclude that research utilization is an expectation of clinical nurse educators, and as such, the role itself may be the driver that sets them apart. Clinical nurse educators may also be naturally curious, have strong critical thinking dispositions and an interest in research that influences their research utilization behavior.

Different forms of research utilization

To date, only one study was found that tested the differences between instrumental, conceptual, and symbolic research utilization (Estabrooks, 1999a). Our findings provide evidence that such differences do exist. This is illustrated by the variation in the variables that predicted each form of research utilization (see Table 5) and the changes in the coefficient of determination (R^2) across the four models.

Localite communication predicted only conceptual research use. Possible reasons for this may be that face-to-face interactions are a common occurrence in the work environment or discussions with others have an influence on the way individual nurses think about practice, but not enough for them to take direct action. Nurses receiving research findings through casual conversation might question the legitimacy of the information, and be less inclined to use the research in this direct way.

Mass media is a predictor of symbolic research use but was not a factor in any other form of research utilization. We measured mass media by the frequency of use of newspapers, popular magazines, television, and the Internet. Media headlines have wider

impact on the public at large and are generally more readable and more readily understood than information from professional and scientific sources. Newsworthy research findings catch the attention of consumers and nurses alike, making them more amenable to persuasive use.

These logical connections of localite and mass media predictors with conceptual and symbolic research use support the idea that the four types of research utilization are indeed different.

Implications

Clinical nurse educators use research in all forms more than managers and staff nurses. Despite the existence of clinical nurse educators in a wide array of practice environments, the limited research assessing their influence on the professional development of practicing nurses, including the use of research findings, is alarming. We need to conduct research that examines clinical nurse educators in three areas. First, there is an urgent need to conduct research that examines the knowledge, skills, and resources needed by clinical nurse educators to use research effectively in practice. Designing instruments that assess the *actual* ability of participants to use research, rather than those that presently use self-report, would provide us with useful information about the research education needs of clinical nurse educators. Second, researchers need to design intervention studies that examine the effectiveness of clinical nurse educators on research utilization and patient outcomes. We need to ensure the inclusion of variables with potential for change, rather than focusing on determinants we do not have the power to influence. Rather than trying to study all aspects of diffusion of innovations theory, designing research that examines manageable elements of the framework would be more

realistic and informative. Finally, we need to use different analysis techniques, such as structural equation modeling, to advance our theoretical understanding of intermediaries and the determinants of their research use.

Organizations need to examine position descriptions of clinical nurse educators and other nursing intermediaries and clearly articulate responsibility and accountability for research utilization activities. Increased access to technical and educational resources needed for research utilization is essential. Enhancing the social networks of clinical nurse educators with researchers, professional associations, interest groups, and other practice communities may facilitate the travel of knowledge within organizations.

Academic educators need to evaluate current undergraduate and graduate curricula and incorporate research utilization as a component of the research process. Redesigning research courses in graduate programs to ensure graduates have the necessary critique and appraisal skills as well as the ability to conduct systematic literature reviews would improve the effective and appropriate use of research findings in clinical practice. The design of mentorship programs that create linkages between researchers and intermediaries may be an important strategy for mitigating the effects of the theory-practice gap.

Limitations of this study relate to issues of internal and external validity. Clinical nurse educators may have had artificially high scores on some or all items due to the effects of social desirability, particularly since the expectations of the role are high for research utilization in a culture that embraces evidence-based practice. The variables included in these analyses may not be accurate measures of the construct of interest, posing threats to internal validity. Our post-hoc power analysis indicates adequate power

associated with the significant regression coefficients (Table 6). However, those variables that were non-significant in our model may be an indication of too small a sample to detect a difference. We advise caution in generalizing results to similar populations of nurses and clinical nurse educators.

Conclusion

Clinical nurse educators and other intermediaries exhibit research utilization behaviors that are important for the facilitation of evidence-based practice. Clinical nurse educators and other intermediaries in nursing may be an untapped resource in organizations that want to foster a culture of evidence-based nursing practice. The Canadian Health Services Research Foundation's knowledge brokering initiative is one indication of the importance placed on intermediaries as links to enhance the knowledge translation agenda in Canada's health system (Canadian Health Services Research Foundation, 2003). Descriptions of the attributes of knowledge brokers have many similarities with those of clinical nurse educators. Before training yet another intermediary in health care, we should consider existing roles in nursing and what they have to offer. Reconfiguring the clinical nurse educator role and providing education and support to enhance their research knowledge and skill may be important strategies for the pursuit of an evidence base for nursing practice in organizations.

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Figure 1 Variables of Interest*

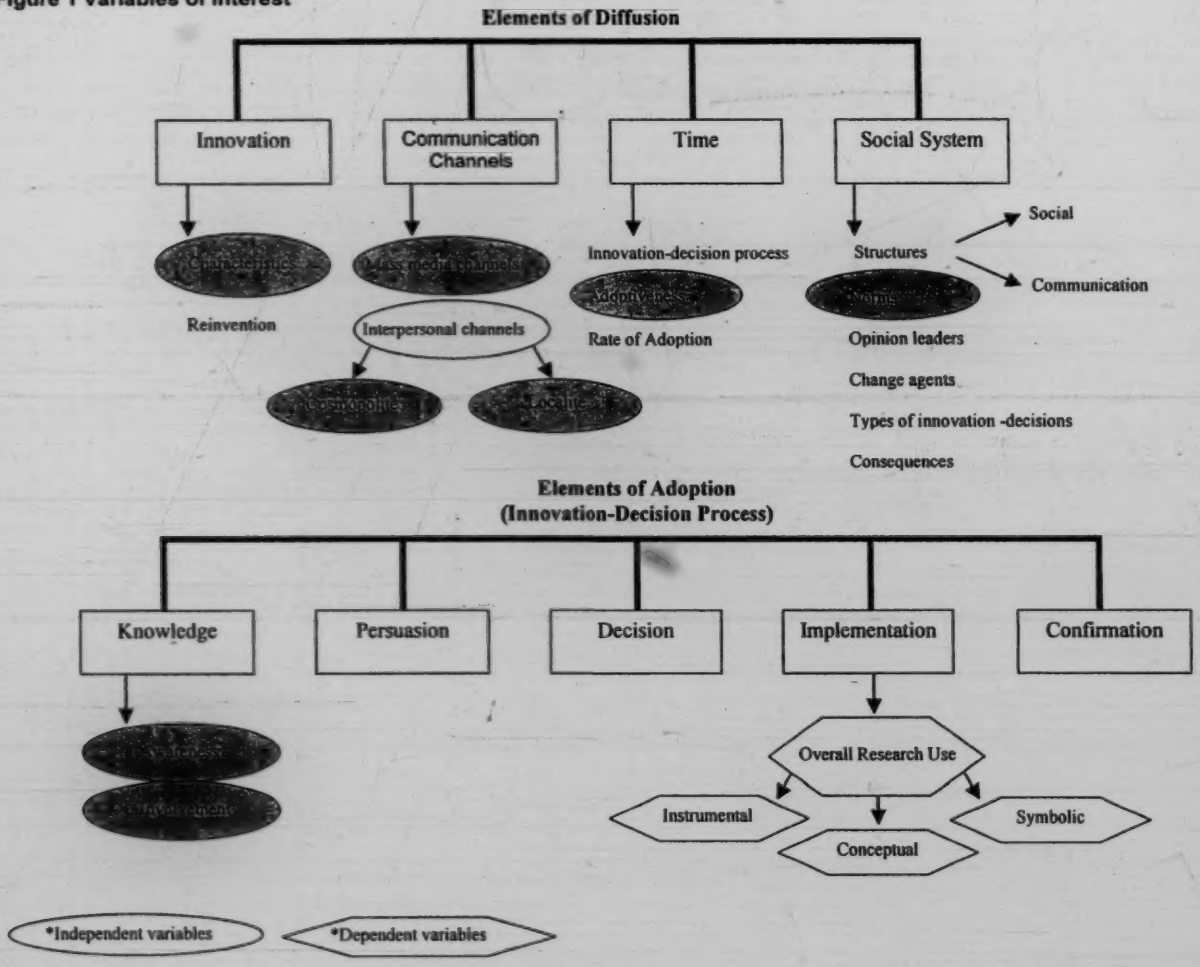

Table 1 Variable Definitions

Variable	Theoretical Definition	Operational Definition (Questions from Alberta Nurse Survey)	Method (Range)	Cronbach alpha
Dependent Variables				
Overall Research Utilization	The use of research findings from scientific research or other types of knowledge (aesthetic, ethical) with a research base to substantiate it, to guide practice (Estabrooks, 1999a)	Overall in the past one year, how often have you used research in some aspect of your nursing practice? (1=never to 5=very often)	Single Item (1-5)	N/A
Instrumental Research Utilization	The direct application of research findings resulting in a concrete change in practice	Overall in the past one year, how often have you used research findings in a DIRECT way in some aspect of your nursing practice?	Single item (1-5)	N/A
Conceptual Research Utilization	The use of research findings that changed your way of thinking and approach to practice	Overall in the past one year, how often have you used research findings in a NON-DIRECT way in some aspect of your nursing practice? (1=never to 5=very often)	Single Item (1-5)	N/A
Symbolic Research Utilization	The citing of research findings in order to persuade others to change practice or influence policy	Overall in the past one year, how often have you used research findings in a PERSUASIVE way in some aspect of your nursing practice? (1=never to 5=very often)	Single Item (1-5)	N/A

Variable	Theoretical Definition	Operational Definition (Questions from Alberta Nurse Survey)	Method (Range)	Cronbach alpha
Independent Variables				
Regional Size	Size of center where respondent is primarily employed	Who is your primary nursing employer (the one where you spend the most working hours)? Regional Health Authority and Site: 1= Rural, 2=Small Urban, 3= Urban	(1-3)	N/A
Innovation	Perceptions of the characteristics of research findings	In terms of reading and using the results of research studies, how important is...(1=not important at all to 5=extremely important) ...presentation of research results in non-technical language ...examples or demonstrations of how to use research results ...focus on implications of research results for use in practice ...appeal of reports and products (graphics, colour, humour, packaging)	Sum (0-20)	α=0.765
Mass media	The means of transmitting messages from a source of one or few to reach an audience of many	How frequently do you use the following sources of information in your daily work? (1=never to 5=very often) ...information you get from the media (e.g. popular magazines, television, the Internet, etc.)	Single Item (1-5)	N/A
Localite	The extent to which one is oriented inside their immediate social context	How frequently do you use the following sources of information in your daily work? (1=never to 5=very often) ...information from coworkers ...information from physicians ...information from other health care professionals ...information brought by patients ...presentations and seminars	Sum (1-25)	α=0.772
Cosmopolite	The extent to which one is oriented outside their immediate social context	In terms of your professional satisfaction, what is the importance of... (1=not important at all to 5=extremely important) ...active involvement in research projects ...participation in professional conferences and workshops involving researchers ...membership on expert-panels, and committees involving researchers	Sum (1-15)	α=0.743

Variable	Theoretical Definition	Operational Definition (Questions from Alberta Nurse Survey)	Method (Range)	Cronbach alpha
Adoptiveness	The degree to which an individual seeks out and is open to new information.	How frequently do you use the following sources of information in you daily work? (1=very often to 5=never) …what has worked for you for years …the ways you have always done it	Sum (1-10)	α=0.697
Involvement	The degree to which an individual is involved in research activities or projects.	In the last 5 years, have you… (yes = 1-2, no=0) …been a principle investigator for a study? (score=2 if y) …been a co-investigator for a study? (score=2 if y) …collected data for a research study? (score=1 if y) …been involved in outcomes, evaluation, or quality assurance projects? (score=1 if yes) …carried out an in-depth review of the literature? (score=1 if y)	Count (0-7)	α=0.596
Traditional norms	Social or practice norms that influence the ability of individuals to utilize research findings in practice.	The translation of research results into new or improved health services is hampered by…(1=strongly disagree to 5=strongly agree) …research conflicts with traditions and opinions leader preferences in your area	Single item (1-5)	N/A
Awareness	The frequency with which an individual accesses information sources with a strong research base to support them	How frequently do you use the following sources of information in your daily work? (1=never to 5=very often) …systematic reviews (including meta-analysis) …computerized literature search (Medline, CINAHL, PubMed, etc.) …publications that focus on evidence-based practice …Cochrane collaborative reviews …original studies published in scientific journals	Sum (1-25)	α=0.769
Attitude	Attitude toward research	Overall, in your practice, would you say research…(1=never to 5=very often) …is pertinent to your professional practice? …meets your needs and expectations? …is a preferred source of information?	Sum (1-15)	α=0.701

Dummy Variables	
Educator	Dichotomous variable: - coded '1' if the respondent is classified as an educator - coded '0' if the respondent is classified as an staff nurse or manager
Staff nurse	Dichotomous variable: - coded '1' if the respondent is classified as a staff nurse - coded '0' if the respondent is classified as an educator or manager
Manager	Dichotomous variable: - coded '1' if the respondent is classified as a manager - coded '0' if the respondent is classified as an educator or staff nurse
Degree	Dichotomous variable: - coded '1' if the respondent has a degree - coded '0' if the respondent has a diploma
Diploma	Dichotomous variable: - coded '1' if the respondent has a diploma - coded '0' if the respondent has a degree

Table 2 Demographic characteristics by nurse group

Education	Diploma	Degree
Educators	32% (n=24)	68% (n=50)
Staff nurses	70% (n=111)	30% (n=47)
Managers	38% (n=85)	62% (n=53)

Regional size	Urban	Small Urban	Rural
Educators	54% (n=40)	32% (n=24)	14% (n=10)
Staff nurses	34% (n=54)	34% (n=55)	32% (n=49)
Managers	32% (n=44)	31% (n=43)	37% (n=51)

Employment Status	FTR	PTR	Casual
Educators	54% (n=44)	40% (n=33)	6% (n=5)
Staff nurses	37% (n=59)	50% (n=80)	17% (n=22)
Managers	86% (n=125)	11% (n=16)	.03% (n=4)

Primary Work Setting	Hospital	Community	Long term care	Other
Educators	57% (n=47)	18% (n=15)	5% (n=4)	17% (n=16)
Staff nurses	67% (n=107)	17% (n=27)	12% (n=20)	4% (n=7)
Managers	40% (n=58)	20% (n=29)	20% (n=29)	20% (n=29)

Table 3. Dependent variables and post hoc multiple comparisons by nurse group

Dependent Variable	Nurse Group Mean Score (*SD*)			One-way ANOVA *P*-value
	Staff (n=158)	Educator (n=74)	Manager (n=138)	
Overall RU (1-5)	3.63 4.40	4.40 (.88)	3.81 (.76)	.000**
Instrumental RU (1-5)	3.46 4.01	4.01 (.93)	3.50 (1.12)	.000**
Conceptual RU (1-5)	3.58 4.20	4.20 (.91)	3.77 (.90)	.000**
Symbolic RU (1-5)	2.60 3.50	3.50 (1.17)	3.27 (1.13)	.000**
Age	42.8 (10.01)	42.89 (7.75)	48.65 (6.91)	.000**
Attitude (1-15)	10.59 (2.44	12.31 (1.81)	11.29 (2.02)	.000**
Awareness (1-25)	11.7 (3.60)	15.96 (3.91)	13.69 (3.25)	.000**
Adoptiveness (1-10)	6.09 (1.95)	7.16 (1.96)	6.89 (2.04)	.000**
Localite (1-25)	21.42 (2.70)	19.41 (4.06)	20.05 (3.43)	.000**
Involvement (1-7)	1.31 (1.38)	2.84 (1.72)	2.48 (1.61)	.000**
Cosmopolite (1-15)	9.39 (2.48)	11.08 (2.14)	9.80 (2.43)	.000*

Parametric multiple comparison: Tukey HSD[a]

	Group	Subset for alpha=.05 (group means reported)		
		1	2	3
Overall RU	Staff	3.63		
	Educators		4.40	
	Managers	3.81		
Instrumental RU	Staff	3.46		
	Educators		4.01	
	Managers	3.50		
Conceptual RU	Staff	3.58		
	Educators		4.20	
	Managers	3.77		
Symbolic RU	Staff	2.60		
	Educators		3.50	
	Managers		3.27	
Age	Staff	42.8		
	Educators	42.89		
	Managers		48.65	
Attitude	Staff	10.59		
	Educators		12.31	
	Managers			11.29
Awareness	Staff	11.7		
	Educators		15.96	
	Managers			13.69
Adoptiveness	Staff	6.09		
	Educators		7.16	
	Managers		6.89	
Localite	Staff	21.42		
	Educators		19.41	
	Managers		20.05	
Involve	Staff	1.31		
	Educators		2.84	
	Managers		2.48	
Cosmopolite	Staff	9.39		
	Educators		11.08	
	Managers	9.80		

* test is significant at .05

**test is significant at .01

[a]Parametric one-way analysis of variance was used to test the null hypothesis that group means are equal

Table 4 Correlations between independent and dependent variables included in the model

	Overall research use	Instrumental research use	Conceptual research use	Symbolic research use
Age	**-.112(*)**	**-.124(*)**	-.098	**.125(*)**
Awareness	**.519(**)**	**.284(**)**	**.301(**)**	**.430(**)**
Adoptiveness	**.397(**)**	**.199(**)**	**.162(**)**	**.227(**)**
Attitude toward research	**.503(**)**	**.331(**)**	**.273(**)**	**.323(**)**
Cosmopolite	**.304(**)**	**.151(**)**	**.257(**)**	**.274(**)**
Localite	-.023	.051	**.103(*)**	-.030
Mass media	.011	-.037	.046	**.177(**)**
Innovation	**.211(**)**	**.146(**)**	**.204(**)**	**.147(**)**
Involve	**.361(**)**	**.186(**)**	**.214(**)**	**.307(**)**
Traditional norms	-.028	-.040	.056	.042
Educators	**.325(**)**	**.205(**)**	**.237(**)**	**.195(**)**
Administrators	-.038	-.064	-.004	**.153(**)**
Staff Nurses	**-.230(**)**	**-.106(*)**	**-.189(**)**	**-.316(**)**
Diploma education	**-.187(**)**	-.099	**-.159(**)**	**-.186(**)**
Degree education	**.188(**)**	.100	**.163(**)**	**.187(**)**
Total N	370	370	370	370

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Table 5 Regression Results for all forms of Research Utilization (RU)

	Overall RU		Instrumental RU		Conceptual RU		Symbolic RU	
	R^2 Adj.= .39		R^2 Adj.= .14		R^2 Adj.= .16		R^2 Adj.= .26	
	B	t-value	B	t-value	B	t-value	B	t-value
Constant[+]	**1.682****	**3.581**	**2.389****	**3.467**	**1.839****	**3.083**	-.308	-.415
Age	**-.011***	**-2.473**	-.012	-1.882	-.010	-1.844	.010	1.411
Attitude	**.098****	**4.276**	**.120****	**3.585**	.046	1.585	**.075***	**2.080**
Awareness	**.063****	**5.656**	**.037***	**2.248**	.027	1.901	**.076****	**4.340**
Adoptiveness	.019	1.009	-.019	-.696	-.009	-.353	-.014	-.474
Localite	.002	.142	.013	.760	**.031***	**2.082**	-.001	-.069
Cosmopolite	-.011	-.683	-.030	-1.226	.026	1.250	.030	1.147
Mass Media	.033	.815	-.040	-.679	.048	.942	**.194****	**3.042**
Innovations	.022	1.393	.028	1.197	.035	1.722	.007	.292
Involvement	**.170****	**3.757**	**.142***	**2.138**	.082	1.424	**.176***	**2.457**
Traditional norms	-.010	-.312	-.029	-.622	.033	.816	.058	1.163
Regional size	.030	.676	-.037	-.570	.066	1.176	.084	1.205
Manager	**-.265****	**-2.586**	-.237	-1.578	**-.268***	**-2.063**	-.090	-.555
Staff Nurse	-.194	-1.792	-.166	-1.045	**-.382****	**-2.776**	**-.345***	**-2.018**
Diploma	.023	.289	-.001	-.011	-.105	-1.053	-.106	-.853

[+]Reference group equal educators with a degree
**Significant at the 0.01 level
*Significant at the 0.05 level

Table 6 Power Analysis for Regression Coefficients – Overall RU

Variable	R^2 without variable	R^2 with variable	R^2 contributed	Power
Age	0.404	0.415	0.011	0.776*
Attitude	0.355	0.415	0.060	1.0*
Awareness	0.359	0.415	0.056	1.0*
Adoptiveness	0.415	0.415	0.000	
Localite	0.415	0.415	0.000	
Cosmopolite	0.414	0.415	0.001	0.128
Mass media	0.415	0.415	0.000	
Innovation	0.413	0.415	0.002	0.210
Involvement	0.390	0.415	0.025	0.986*
Norms	0.405	0.415	0.010	0.736
Regional size	0.414	0.415	0.001	0.128
Manager	0.402	0.415	0.013	0.842*
Staff nurse	0.409	0.415	0.006	0.516
Diploma	0.415	0.415	0.000	

* Variables with significant regression coefficients

Clinical Nurse Educators and Research Utilization
Systematic Research Overview (2004)
Quality Assessment Tool for Descriptive Studies

Study: _____ **First Author:** _____

Publication Information: Date: _____ **Journal:** _____

Design:	**No**	**Yes**
Was study prospective?	0	1
Was probability sampling used?	0	1

Sample:	**No**	**Yes**
Sample/subgroup of CNE's specifically	0	1
Was sample size justified?	0	1
Was sample drawn from more than one site?	0	1
Was anonymity protected	0	1
Response rate more than 60%	0	1

Measurement:	**No**	**Yes**
Descriptive studies variables theoretically and operationally defined?	0	1

Statistical Analysis:	**No**	**Yes**
For descriptive studies, are results analyzed appropriately?	0	1

Relevance	**No**	**Yes**
Is design appropriate to the research purpose?	0	1
Do the findings and conclusions answer the research question?	0	1

Total: _____/11

Overall Study Validity Rating (circle one) **LO** **MED** **HI**

(Descriptive: 0-4 = LO; 5-8 = MOD; 9-11 = HI)

Clinical Nurse Educators and Research Utilization
Systematic Research Overview (2004)
Quality Assessment Tool for Correlational Studies

Study: _____ **First Author:** _____

Publication Information: Date: _____ **Journal:** _____

Design:	**No**	**Yes**
Was study prospective?	0	1
Was probability sampling used?	0	1

Sample:	**No**	**Yes**
Sample/subgroup of CNE's specifically	0	1
Was sample size justified?	0	1
Was sample drawn from more than one site?	0	1
Was anonymity protected	0	1
Response rate more than 60%	0	1

Measurement:	**No**	**Yes**
Correlational studies		
Individual determinants (IVs) [assess for IVs correlated with DV only]		
Are determinants measured reliably?	0	1
Is the full range measured?	0	1
Research utilization (DV)		
Is RU observed rather than self-reported?	0	2
If scale used for RU, is internal consistency ≥ .70?	0	1
Was full range for RU scores used?	0	1

Statistical Analysis:	**No**	**Yes**
If multiple determinants studied, are inter-correlations analysed?	0	1
Are outliers managed?	0	1

Relevance	**No**	**Yes**
Is design appropriate to the research purpose?	0	1
Do the findings and conclusions answer the research question?	0	1

Total: _____/17

Overall Study Validity Rating (circle one)
LO MED HI

(Correlational: 0-5 = LO; 6-12 = MOD; 13-17= HI)

Validity Assessment Tool Qualitative Studies	
Criteria	**Criteria met? (yes =1; no=0)**
Literature Review • Comprehensive, synthesized • Philosophical framework used	
Use of a theoretical context/framework	
Design • Adequately described/compatible with purpose • Adherence to methodological assumptions • Ethics – protection of subjects	
Sample • Theoretically driven • Characteristics identified • Adequate for saturation • Research context appropriate	
Analysis • Strategies appropriate to purpose and findings • Connections between data, interpretations and literature	
Findings • Understandable, clearly presented • Placed in context	
Implications • Reflect findings • Significance • Recommendations	
Total score	/7
Overall Rating (Key: 0-3=Low; 4-6=Moderate; 7=High)	